DRAFTSMAN

Consensus phytase

CLASS SUBCLASS



1/56

	· !				
	,				50
	1 KhsDCNSVDh (WOCEDEL CIL	LWCI VADVES 1	LODESPEPID V	VPEDChITFV
A. terreus 9A-1	NhsDCTSVDr (SYQUEPELSA	LWCIVARVEG 1	LODESDEDID 1	VPDDChITFV
A. terreus cbs		3YQCFPELSH	THEOUGH PER	LANESAISPD '	VPAGCrVTFA
A. niger var. awamo	ri NqsTCDTVDQ (NqsSCDTVDQ (YOCFSETSH	LWGQIAFFFS	TANEGUIGED '	VDAGC~VTFA
A. niger T213	NgsSCDTVDQ (SYOCESETSH	LWGQIAPTES	TANGOVICED '	VDACC~VTFA
A. niger NRRL3135	ndsscolvpd (SYQCESETSH	LWGQXAPFFS~	THURSAISER	T.DKDCxTTIM
A. fumigatus 13073	GSKSCDTVDI (GYQCsPATSH	LWGQYSFFFS	THDEIGNOCK :	T DADCTIITA
A. fumigatus 32722	GSKSCDTVD1	GYQCsPATSH	LWGGYSPEES	TEDEISASSK	T DADCT I I IIA
A. fumigatus 58128	GSKSCDTVD1 (GYQCsPATSH	LWGQYSPFFS	LEDEISVSSK	DADCE I IDA
A. fumigatus 26906	GSKSCDTVD1 (GYQCsPATSH	LWGQYSPFFS	TEDEISASSK	T DADC ~ NAEM
A. fumigatus 32239	GSKACDTVEL (GYQCsPGTSH	LWGQYSPFFS	TEDET2A22D	TENDET ALL A
E. nidulans	QNHSCNTADG (GYQCFPNVSH	VWGQYSPYFS	1EQESAISED	VPRGCEVIEV
T. thermophilus	DSHSCNTVEG	GYQCrPEISH	sWGQYSPFFS	PADOSEISAD	VPQNCKIIFV
M. thermophila	ESRPCDTpDl (GFQCgTAISH	FWGQYSPYFS	VpSEIDas	IPDDCevifA
_					upppe ummi
Consensus	NSHSCDTVDG	GYQCFPEISH	LWGQYSPYFS	LEDESAISPD	VPDDC-VIFV
Consensus phytase	NSHSCDTVDG	GYQCFPEISH	LWGQYSPYFS	LEDESAISPD	VPDDCRVTFV
					100
	51				100
A. terreus 9A-1	QVLARHGARs	PThSKtKAYA	AtIAAIQKSA	TaFpGKYAFL	QSYNYSLDSE
	QVLARHGARs	PTDSKtKAYA	Atiaaiqkna	TaLpGKYAFL	KSYNYSMGSE
A. terreus cos A. niger var. awamo	ri QVLSRHGARY	PTESKgKkYS	ALIEEIQQNV	TtFDGKYAFL	KTYNYSLGAD
A. niger T213	OVI.SRHGARY	PTESKakkys	ALTERIOONA	ICEDGRIAED	KIIMISHOM
A. niger NRRL3135	QVLSRHGARY	PTDSKgKkYS	ALIEEIQQNA	TtFDGKYAFL	KTYNYSLGAD
A. fumigatus 13073	QVLSRHGARY	PTSSKsKkYK	kLVTAIQaNA	TdfKGKFAFL	KTYNYTLGAD
A. fumigatus 32722	QVLSRHGARY	PTSSKsKkYK	kLVTAIQaNA	TdfKGKFAFL	KTYNYTLGAD
A. fumigatus 58128	QVLSRHGARY	PTSSKsKkYK	kLVTAIQaNA	TdfKGKFAFL	KTYNYTLGAD
A. fumigatus 26906	QVLSRHGARY	PTSSKsKkYK	kLVTAIQaNA	TdfKGKFAFL	KTYNYTLGAD
A. fumigatus 32239	OVLSRHGARY	PTASKsKkYK	kLVTAIQKNA	TeFKGKFAFL	ETYNYTLGAD
E. nidulans	OVLSRHGARY	PTESKsKAYS	GLIEAIQKNA	TsFwGQYAFL	ESYNYTLGAD
T. thermophilus	OLLSRHGARY	PTSSKtElYS	QLISTIQKTA	TaYKGyYAFL	KDYrYqLGAN
M. thermophila	OVLSRHGARa	PTlKRaaSYv	DLIDrIHhGA	IsYgPgYEFL	RTYDYTLGAD
iii diidiiidpiii					
Consensus	OVLSRHGARY	PTSSK-KAYS	ALIEAIQKNA	T-FKGKYAFL	KTYNYTLGAD
Consensus phytase	QVLSRHGARY	PTSSKSKAYS	ALIEAIQKNA	TAFKGKYAFL	KTYNYTLGAD
2 1					
	101				150
A. terreus 9A-1	ELTPFGrNQL	rDlGaQFYeR	YNALTRhInP	FVRATDASRV	hESAEKFVEG
3	NLTPFGrNQL	qDlGaQFYRR	YDTLTRhInP	FVRAADSSRV	hesaekfveg
A. terreus cos A. niger var. awama	ori DLTPEGEOEL	VNSGIKFYOR	YESLTRNIIP	FIRSSGSSRV	IASGEKFIEG
A. niger T213	DITPFGEOEL	VNSGIKFYQR	YESLTRNIIP	FIRSSGSSRV	TASGERFIEG
A. niger NRRL3135	DITPEGEOEL	VNSGIKFYOR	YESLTRNIVP	FIRSSGSSRV	IASGKKFIEG
A. fumigatus 13073	DIATPEGEOOL	VNSGIKFYOR	YKALARSVVP	FIRASGSDRV	IASGEKFIEG
A. fumigatus 32722	DITPFGEOOL	VNSGIKFYQF	YKALARSVVP	FIRASGSDRV	IASGEKFIEG
A. fumigatus 58128	DITPEGEOOL	VNSGIKFYOR	YKALARSVVP	FIRASGSDRV	IASGEKFIEG
A. fumigatus 26906	DITAFGEOOL	VNSGIKFYOF	YKALARSVVP	FIRASGSDRV	IASGEKFIEG
A. fumigatus 32239	DITPFGEOOM	VNSGIKFYOR	(YKALAgSVVP	FIRSSGSDRV	IASGEKFIEG
E. nidulans	DLTIFGENOM	VDSGaKFYRF	YKNLARKnTP	FIRASGSDRV	VASAEKFING
T. thermophilus	DITPEGENOM	IOlGIKFYnH	I YKSLARNaVP	FVRCSGSDRV	IASGrlFIEG
M. thermophila	ELTRtGOOOM	VNSGIKFYR	R YRALARKSIP	FVRTAGqDRV	VhSAENFTQG
ii. ciicimopiiiia					
Consensus	DLTPFGENOM	VNSGIKFYRI	R YKALARK-VP	FVRASGSDRV	IASAEKFIEG
Consensus phytage	DI.TPFGENOM	VNSGIKFYRI	R YKALARKIVP	FIRASGSDRV	IASAEKFIEG

Fig. 1a

DLTPFGENOM VNSGIKFYRR YKALARKIVP FIRASGSDRV IASAEKFIEG

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APPROVEO	0.G. F	FIG.
YB	CLASS	SUBCLASS
DRAFTSMAH		



	2/50
A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus 13073 A. fumigatus 32722 A. fumigatus 58128 A. fumigatus 26906 A. fumigatus 32239 E. nidulans T. thermophilus M. thermophila	200 GQTARQDDHh ANPHQPSPrV DVAIPEGSAY NNTLEHS1CT AFESSTV FQNARQGDPh ANPHQPSPrV DVVIPEGTAY NNTLEHS1CT AFEASTV FQSTKLkDPr AQPGQSSPKI DVVISEASSS NNTLDPGTCT VFEDSEL FQSTKLkDPr AQPGQSSPKI DVVISEASSS NNTLDPGTCT VFEDSEL FQGAKLADPG A.TNRAAPAI SVIIPESETF NNTLDHGVCT KFEASQL FQQAKLADPG SGQATPVV NVIIPESETY NNTLDHSVCT NFEASEL FQSAKLADPG STVRPT1PYD NVIIPEGSGY NNTLDHSCCV VFEDSSG FQSAKLADPG S-PHQASPVI NVIIPEGSGY NNTLDHGTCT AFEDSEL FQSAKLADPG S-PHQASPVI NVIIPEGSGY NNTLDHGTCT AFEDSEL FQSAKLADPG S-PHQASPVI NVIIPEGSGY NNTLDHGTCT AFEDSEL
Consensus phytase	- Anthread
A. terreus 9A-1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus 13073 A. fumigatus 32722 A. fumigatus 58128 A. fumigatus 26906 A. fumigatus 32239 E. nidulans T. thermophilus M. thermophila	250 GDDAVANFTA VFAPAIAQRL GDAAADNFTA VFAPAIAKRL ADTVEANFTA TFAPSIRQRL ADTVEANFTA TFAPSIRQRL ADTVEANFTA TFAPSIRQRL GDEVAANFTA TFAPDIRARA GDEVAANFTA 1FAPDIRARA GDEVAANFTA 1FAPAIRARI GDDAQEKFAK GDDAQDTY1S TFAGPILARV GDDAQAAANFTA TFAPAIRARL GDDAQAAANFTA TFAPAIRARL GDDAAAANFTA TFAPAIRARL GADLPGVULT DEDVVLMDM CPFETVARTS DEDVVLLMDM CSFDTVARTA NANLPGANLT DEDVVLLMDM CPFETVARTS DEDVVLLMDM CPFETVARTS DEDVVLLMDM CPFETVARTS
	TRADALBARI, EADLPGVTLT DEDVV-LMDM CPFEIVARIS
Consensus	GDDAEANFTA TFAPATRARI BADIDONTI.T DEDVVYLMDM CPFETVARTS
Consensus phytase	GDDAEANFTA TFAPAIRARL EADLPGVTLT DEDVVYLMDM CPFETVARTS GDDVEANFTA LFAPAIRARL EADLPGVTLT DEDVVYLMDM CPFETVARTS
Consensus bulcase	
A. terreus 9A-1 A. terreus cbs A. niger var. awamo A. niger T213 A. niger NRRL3135 A. fumigatus 13073 A. fumigatus 32722 A. fumigatus 58128 A. fumigatus 26906 A. fumigatus 32239 E. nidulans T. thermophilus M. thermophila	251 DANTLSPFC DLFTATEWTQ YNYLISLDKY YGYGGGNPLG DANTLSPFC DLFTAAEWTQ YNYLISLDKY YGYGGGNPLG VDTKLSPFC DLFTHdEWIN YDYLQSLKKY YGHGAGNPLG VDTKLSPFC DLFTHdEWIN YDYLQSLKKY YGHGAGNPLG VDTKLSPFC DLFTHDEWIN YDYLQSLKKY YGHGAGNPLG VDTKLSPFC DLFTHDEWIN YDYLQSLKKY YGHGAGNPLG VDTKLSPFC DLFTHDEWIN YDYLQSLGKY YGYGAGNPLG VDASQLSPFC QLFTHDEWIN YNYLQSLGKY YGYGAGNPLG DASQLSPFC DLFTHDEWIN YNYLQSLGKY YGYGAGNPLG VDYLQSLGKY YGYGAGNPLG YDYLQSLGKY YGYGAGNPLG YDYLQSLGKY YGYGAGNPLG YDYLQSLGKY YGYGAGNPLG YGYGAGNPLG YDYLQSLGKY YGYGAGNPLG YGYGA
	-DATELSPFC ALFTE-EW YDYLQSLGKT TGTGA CTDI G
Consensus	
Consensus phytase	

APPROVE Ó	O.G. FIG.						
ΒY	CLASS	SUBCLASS					
DRAFTSMAN							

					350
	301				
A. terreus 9A-1	PVQGVGWaNE	LMARLTRAPV	HDHTCVNNTL	DASPATFPLN	ATLYADESHD
A. terreus cbs	PVQGVGWaNE	LIARLTRSPV	HDHTCVNNTL	DANPATFPLN	ATLYADESHD
A. niger var. awamori	PTQGVGYaNE	LIARLTHSPV	HDDTSSNHTL	DSNPATEPLN	STLYADFSHD
A. niger T213	PTQGVGYaNE	LIARLTHSPV	HDDTSSNHTL	DSNPATFPLN	STLYADFSHD
A. niger NRRL3135	PTQGVGYaNE	LIARLTHSPV	HDDTSSNHTL	DSSPATFPLN	STLYADFSHD
A. fumigatus 13073	PAQGIGFtNE	LIARLTRSPV	QDHTSTNsTL	vSNPATFPLN	ATMYVDFSHD
A. fumigatus 32722	PAQGIGFTNE	LIARLTRSPV	QDHTSTNsTL	vSNPATFPLN	ATMYVDFSHD
A. fumigatus 58128	PAQGIGFtNE	LIARLTRSPV	QDHTSTNsTL	vSNPATFPLN	ATMYVDFSHD
A. fumigatus 26906	PAQGIGFtNE	LIARLTRSPV	QDHTSTNsTL	vSNPATFPLN	ATMYVDFSHD
A. fumigatus 32239	PAQGIGFTNE	LIARLTNSPV	QDHTSTNsTL	DSDPATFPLN	ATIYVDFSHD
E. nidulans	PAQGIGFTNE	LIARLTQSPV	QDNTSTNHTL	DSNPATFPLD	rKLYADFSHD
T. thermophilus	PAQGVGFvNE	LIARMTHSPV	QDYTTVNHTL	DSNPATFPLN	ATLYADFSHD
M. thermophila	PTQGVGFvNE	LLARLAgvPV	RDgTSTNRTL	${\tt DGDPrTFPLG}$	rPLYADFSHD
-					
Consensus	PAQGVGF-NE	LIARLTHSPV	QDHTSTNHTL	${\tt DSNPATFPLN}$	ATLYADFSHD
Consensus phytase	PAQGVGFANE	LIARLTRSPV	QDHTSTNHTL	DSNPATFPLN	ATLYADFSHD
	351				400
A. terreus 9A-1	SNLVSIFWAL	GLYNGTAPLS	qTSVESVSQT	DGYAAAWTVP	FAARAYVEMM
A. terreus cbs	SNLVSIFWAL	GLYNGTkPLS	qTTVEDITrT	DGYAAAWTVP	FAARAYIEMM
A. niger var. awamori	NGIISILFAL	GLYNGTkPLS	TTTVENITQT	DGFSSAWTVP	FASRLYVEMM
A. niger T213	NGIISILFAL	GLYNGTkPLS	TTTVENITQT	DGFSSAWTVP	FASRIYVEMM
A. niger NRRL3135	NGIISILFAL	GLYNGTkPLS	TTTVENITQT	DGFSSAWTVP	FASRLYVEMM
A. fumigatus 13073	NSMVSIFFAL	GLYNGTEPLS	rTSVESaKEl	DGYSASWVVP	FGARAYFEtM
A. fumigatus 32722	NSMVSIFFAL	GLYNGTGPLS	rTSVESaKEl	DGYSASWVVP	FGARAYFEtM
A. fumigatus 58128	NSMVSIFFAL	GLYNGTEPLS	rTSVESaKEl	DGYSASWVVP	FGARAYFEtM
A. fumigatus 26906	NSMVSIFFAL	GLYNGTEPLS	rTSVESaKEl	DGYSASWVVP	FGARAYFEtM
A. fumigatus 32239	NGMIPIFFAM	GLYNGTEPLS	qTSeESTKES	NGYSASWAVP	FGARAYFEtM
E. nidulans	NSMISIFFAM	GLYNGTQPLS	mDSVESIQEm	DGYAASWTVP	FGARAYFELM
T. thermophilus	NTMTSIFaAL	GLYNGTAkLS	TTEIKSIEET	DGYSAAWTVP	FGGRAYIEMM
M. thermophila	NDMMGVLgAL	GaYDGVPPLD	KTArrDpEEl	GGYAASWAVP	FAARİYVEKM
-					
Consensus	NSMISIFFAL	GLYNGTAPLS	TTSVESIEET	DGYAASWTVP	FGARAYVEMM
Consensus phytase	NSMISIFFAL	GLYNGTAPLS	TTSVESIEET	DGYSASWTVP	FGARAYVEMM
					450
	401				450
A. terreus 9A-1	QC	RAEKE	PLVRVLVNDR	VMPLHGCPTD	KLGRCKTDAF
A. terreus cbs	QC	RAEKQ	PLVRVLVNDR	VMPLHGCAVD	NEGRCKTODE
A. niger var. awamor:	QC	QAEQE	PLVRVLVNDR	VVPLHGCPID	algerrose
A. niger T213	QC	QAEQE	PLVRVLVNDR	VVPLHGCPID	aLGRCTTDSF
A. niger NRRL3135	QC	QAEQE	PLVRVLVNDR	VVPLHGCPVD	aLGRCTrDSF
A. fumigatus 13073	OC	KSEKE	: PLVRALINDR	VVPLHGCDVD	KTGKCKTNDF.
A. fumigatus 32722	QC	KSEKE	PLVRALINDR	VVPLHGCDVD	KLGRCKLNDF
A. fumigatus 58128	QC	KSEKE	SLVRALINDR	VVPLHGCDVD	KLGRCKLNDF
A. fumigatus 26906	QC	KSEKE	PLVRALINDR	VVPLHGCDVD	KLGRCKLNDF
A. fumigatus 32239	QC	KSEKE	PLVRALINDR	VVPLHGCAVD	KLGRCKLKDF
E. nidulans	QC	E.KKE	: PLVRVLVNDR	VVPLHGCAVD	KFGRCTLDDW
T. thermophilus	QC	DDSDE	: PVVRVLVNDR	VVPLHGCEVD	SLGRCKTDDF
M. thermophila	RCsgggggg	ggegrQEKDE	: eMVRVLVNDR	VMTLkGCGAD	ETGMCTLETF
				tamini itaasin	עו מסמעו חחיי
Consensus	QC	QAEKE	PLVRVLVNDR	VVPLHGCAVD	VTGKCKTDDE.
Consensus phytase	QC	QAEKE	: PLVRVLVNDR	VVPLHGCAVD	KLGRCKRDDF

	451	471
A. terreus 9A-1	VAGLSFAQAG	
A. terreus cbs	VEGLSFARAG	
A. niger var. awamori		GDWAECsA~~ ~
A. niger T213	VrGLSFARSG	GDWAECFA~~ ~
A. niger NRRL3135	VrGLSFARSG	
A. fumigatus 13073	VKGLSWARSG	GNWGECFS~~ ~
A. fumigatus 32722	VKGLSWARSG	GNWGECFS~~ ~
A. fumigatus 58128	VKGLSWARSG	GNWGECFS~~ ~
A. fumigatus 26906		GNWGECFS~~ ~
A. fumigatus 32239	VKGLSWARSG	
F. nidulans	VEGLNFARSG	GNWkTCFT1~ ~
T. thermophilus	VrGLSFARqG	GNWEGCYAas e
M. thermophila	IESMAFARGN	
_		
Consensus	VEGLSFARSG	GNWAECFA
Consensus phytase	VEGLSFARSG	GNWAECFA

O.G. FIG.

	CP-1 ECORI M G V F V V L L S I A T L F G S	Т
	TATATGAATTCATGGGCGTGTTCGTCGTGCTACTGTCCATTGCCACCTTGTTCGGTTCC	CA
	TATATGAATTCATGGGCGTGTTCGTCGTGCTACTGTCGTCGTCGTCGTCGTCGTCGTCGTCGTCGTCGTCGT	-+ 60
1	ATATACTTAAGTACCCGCACAAGCAGCACGATGACAGGTAACGGTGGAACAAGCCAAG	GТ
	ATATACTTAAGTACCCGCACAAGCAGCACGATGACAGGTAACGGTGACAGGTAACGGTGACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAGGTAACAAGGTAACAGAGAAGAACAAGAGAAGAACAAGAACAAGAAACAAGAACAAGAAACAAGAAACAAGAAAAAA	
	S G T A L G P R G N S H S C D T V D G	G
	CATCCGGTACCGCCTTGGGTCCTCGTGGTAATTCTCACTCTTGTGACACTGTTGACGG	120
61	++	7 120
	GTAGGCCATGGCGGAACCCAGGAGCACCATTAAGAGTGAGAACACTGTGACAACTGCC	AC .
	CP-2	
	CP-3	L
	Y Q C F P E I S H L W G Q Y S P Y F S	_
	GTTACCAATGTTTCCCAGAAATTTCTCACTTGTGGGGTCAATACTCTCCATACTTCTC	TT
121		
	CAATGGTTACAAAGGGTCTTTAAAGAGTGAACACCCCAGTTATGAGAGGTATGAAGAG	AA
		_
	EDESAISPDVPDDCRVTFV	
	TGGAAGACGAATCTGCTATTTCTCCAGACGTTCCAGACGACTGTAGAGTTACTTTCGT	TC
181		-+ 240
	ACCTTCTGCTTAGACGATAAAGAGGTCTGCAAGGTCTGCTGACATCTCAATGAAAGCA	AG
	CP-4	
	CP-5	
	V L S R H G A R Y P T S S K S K A Y S	
	AAGTTTTGTCTAGACACGGT GCTAGATACCCAACTTCTTCTAAGTCTAAGGCTTACTC	TG
241		-+ 300
	TTCAAAACAGATCTGTGCCACGATCTATGGGTTGAAGAAGATTCAGATTCCGAATGAG	AC
		K
	CTTTGATTGAAGCTATTCAAAAGAACGCTACTGCTTTCAAGGGTAAGTACGCTTTCTT	GA
301		-+ 360
	GAAACTAACTTCGATAAGTTTTCTTGCGATGACGAAAGTTCCCATTCATGCGAAAGAA	CT
	CP-6	
	CP-7	
	T I N I I I G A D D I I I I G I	V
	AGACTTACAACTACACTTTGGGTGCTGACGACTTGACTCCATTCGGTGAAAACCAAAT	:GG
361		-+ 420
	TCTGAATGTTGATGTGAAACCCACGACTGCTGAACTGAGGTAAGCCACTTTTGGTTTA	rCC
	NSGIKFYRRYKALARKIVP	
	TTAACTCTGGTATTAAGTTCTACAGAAGATACAAGGCTTTGGCTAGAAAGATTGTTCC	'AT
421		-+ 480
	AATTGAGACCATAATTCAAGATGTCTTCTATGTTCCGAAACCGATCTTTCTAACAAGG	TA
	CP-8	
	CP-9	
	I R A S G S D R V I A S A E K F I E G	F
	TCATTAGAGCTTCTGGTTCTGACAGAGTTATTGCTTCTGCTGAAAAGTTCATTGAAGG	TT
481		+ 540
	AGTAATCTCGAAGACCAAGACTGTCTCAATAACGAAGACGACTTTTCAAGTAACTTCC	CAA
	Q S A K L A D P G S Q P H Q A S P V I	D
	TCCAATCTGCTAAGTTGGCTGACCCAGGTTCTCAACCACCAAGCTTCTCCAGTTAT	PTG
541	1++	
	лссттаса ссаттеа а сссастенственте выпуска в доста в д	

Fig. 2a

APPROVED	O.G. FIG.						
BY	CLASS	SUBCLASS					
DRAFTSMAN							

CP-11 V I I P E G S G Y N N T L D H G T C T A **ACGTT**ATTATTCCAGAAGGaTCcGGTTACAACAACACTTTGGACCACGGT**ACTTGTACTG** 601 -----+ 660 TGCAATAATAAGGTCTTCCtAGgCCAATGTTGTTGTGAAACCTGGTGCCATGAACATGAC F E D S E L G D D V E A N F T A L F A P CTTTCGAAGACTCTGAATTGGGTGACGACGTTGAAGCTAACTTCACTGCTTTGTTCGCTC 661 -----+ 720 AIRARLEADLPGVTLTDEDV **CAGCTATTAGAGCTA**GATTGGAAGCTGACTTGCCAGGTGTTACTTTGACTGACGAAGACG 721 -----+ 780 CP-13 V Y L M D M C P F E T V A R T S D A T E TTGTTTACTTGATGGACATGTGTCCATTCGAAACTGTTGCTAGAACTTCTGACGCTACTG 781 ------ 840 ${\tt AACAAATGAACTACCTGTAC} ACAGGTAAGCTTTGACAACGATCTTGAAGACTGCGATGAC$ LSPFCALFTHDEWRQYDYLQ AATTGTCTCCATTCTGTGCTTTGTT CACTCACGACGAATGGAGACAATACGACTACTTGC841 -----+ 900 TTAACAGAGGTAAGACACGAAACAAGTGAGTGCTGCTTACCTCTGTTATGCTGATGAACG CP-15 S L G K Y Y G Y G A G N P L G P A Q G V AATCTTTGGGTAAGTACTACGGTTACGGTGCTGGTAACCCATTGGGTCCAGCTCAAGGTG 901 -----+ 960 TTAGAAACCCATTCATGATGCCAATGCCACGACCATTGGGTAACCCAGGTCGAGTTCCAC G F A N E L I A R L T R S P V Q D H T S TTGGTTTCGCTAACGAATTGATTGCTAGATTGACTAGATCTCCAGTTCAAGACCACACTT 961 -----+ 1020 AACCAAAGCGATTGCTTAACTAACGATCTAACTGATCTAGAGGTCAAGTTCTGGTGTGAA CP-16 CP-17 TNHTLDSNPATFPLNATLYA CTACTAACCACACTTTGGACTCTAACCCAGCTACTTTCCCCATTGAACGCTACTTTGTACG 1021 -----+ 1080 ${\tt GATGATTGGTGTAAACCTGAGATTGGGTCGATGAAAGGGTAACTTGCGATGAAACATGC}$ D F S H D N S M I S I F F A L G L Y N G $\textbf{CTGACTTCTCACGACAACTCTATGATTTCTATTTTCTTCGCTT} \\ \textbf{GGTTTGTACAACG} \\$ 1081 -----+ 1140 GACTGAAGAGAGTGCTGTTGAGATA**CTAAAGATAAAAGAAGCGAAACCCAAACATGTTGC** CP-18 CP-19 T A P L S T T S V E S I E E T D G Y S A GTACTGCTCCATTGTCTACTACTTCTGTTGAATCTATTGAAGAAACTGACGGTTACTCTG 1141 -----+ 1200

Fig. 2b

CATGACGAGGTAACAGATGATGAAGACAACTTAGATAACTTCTTTGACTGCCAATGAGAC

APPROVED	O.G. FIG.							
87	CLASS	SUBCLASS						
DRAFTSHAN								

		S	W	Т	V	P	F	G	A	R	A	Y	V	E	M	M	Q	C	Q	A	E	
	CT	TC:	rtg	GAC'	rgt'	rcc	ATT	CGG'	rgc'	TAG.	AGC'	TTA	CGTI	'GA	AAT	GAT	GCA	ATG	TCA	AGC	TG	
1201				+				+			-+-		-	-+-				+			-+	1260
	GA	AG/	AAC	CTG	ACA	AGG'	TAA	GCC2	ACG	ATC'	rcg	AAT	GCAA	CTT	ГТА	CTA	CGT	TAC	AGT	TCG	AC	
													CP-	-20								
													01		P-	21						
			-	_	-		_	T. 7	_			_	_				_		~	_	_	
												_	R				_		_	_		
	AA	AAC	3GA/	ACC	ATTC	3GT	raga	AGT"	TTTC	GT'	raa(CGA	CAGA	\GT'	rgt'	TCC	ATT	GCA	CGG	TTG	TG	
1261				+				+			-+-			-+-			-	+			-+	1320
	TT'	TTC	CTT	rgg:	raa(CCA	ATC:	[CA	AAA	CCA	ATT	GCT(GTCI	CA	\CA	AGG'	TAA	CGT	GCC.	AAC.	AC	
	•	V	D	K	L	G	R	С	K	R	D	D	F	v	E	G	L	s	F	Α	R	
	CT	GT]	'GAC	CAAC	3TTC	GG:	rag <i>i</i>	ATG:	raa(3AG	AGA	CGA	CTTC	GT1	'GA	AGG'	TTT	GTC'	TTT	CGC'	TA	
1321			. 	4-				L			- +			- 4 -			- - -	<u> </u>				1380
											-		GAAG	-				•			•	1300
	OA.		1010	,,,,	J 11 10	·CCr	110	Inci	-T-T	J 1 C .		3010		CA	101				nnn'	GCG.		
		_	~	~			_	_	<u></u>	_	_		_		-	C.	P-2:	2				
	-	_	_	_					_	_			Ecc		_							
	GA:	rci	'GG'	rgg'	CAAC	CTGC	GC'	rga.	ATGT	CTTC	CGC'	ΓTAZ	AGAA	TTC	CAT	ATA						
1381				- + -			4		- -		- +			-+-			14	26				
	CTZ	AGA	CCZ	ACCI	TTC	ACC	CCG	CT	CAC	AAA	3CGI	AAT'	CTT	AAC	TA:	TAT						

Basidio

APPROVEG	O.G. FIG.							
87	CLASS	SUBCLASS						
DRAFTSMAN								

8/56

P. involutus P. involutus T. pubescens A. pediades P. lycii	(phyA1) (phyA2)	SvP.RniAPK hiPlRdTSAc GgvvQaTfvQ	FSIPeseQrn LdVTrDvQqs pfFPpQiQds	WSPYSPYFPL WSmYSPYFPa WAAYTPYYPV	AeYkAPPAGC AeYkAPPAGC AtYvAPPASC qaYtPPPkDC EpYaAPPEGC	EInQVNIIQR QInQVHIIQR KItQVNIIQR
Basidio		S-P-R-TAAQ	LPIP-Q-Q	WSPYSPYFPV	A-Y-APPAGC	QI-QVNIIQR
P. involutus P. involutus T. pubescens A. pediades P. lycii	(phyA1) (phyA2)	HGARFPTSGA HGARFPTSGA HGARFPTSGA HGARWPTSGA	ATRIKAGLSK AKRIQTAVAK GTRIQAAVKK rSRqvAAVAK	LQSVqnfTDP LKAAsnyTDP LQSAktyTDP IQmArpfTDP	KFDFIkSfTY 1LAFVtNyTY RLDFLtNyTY KYEFLnDfvY	dLGtsDLVPF sLGqDsLVeL tLGhDDLVPF kFGvADLLPF
Basidio		HGARFPTSGA	ATRIQAAVAK	LQSATDP	KLDFL-N-TY	-LG-DDLVPF
P. involutus P. involutus T. pubescens A. pediades P. lycii Basidio	(phyA1) (phyA2)	GAaQSfDAG1 GAtQSSEAGQ GA1QSSQAGE GAnQShQTGt	EVFARYSKLV EAFTRYSSLV ETFQRYSFLV DmYTRYStLf	SSDNLPFIRS SADELPFVRA SKENLPFVRA egGDVPFVRA	dGSDRVVDSA dGSDRVVDTA SGSDRVVATA SSSNRVVDSA AGdQRVVDSS	TNWTAGFASA nNWTAGFALA TNWTEGFSAA TNWTAGFGdA
P. involutus P. involutus T. pubescens A. pediades P. lycii	(phyA1) (phyA2)	SrNAiqPkLd SsNSitPvLs ShHvlnPiLf	LILPQtGNDT VIISEaGNDT VILSEslNDT	LEDNMCPaAG LDDNMCPaAG LDDaMCPnAG	DSDPQvNaWL ESDPQvDaWL DSDPQvNqWL sSDPQtGiWt DGDest.tWL	AsafPSVTAQ AqFAPPMTAR SIYGTPIAnR
Basidio		S-NTP-L-	VILSE-GNDT	LDDNMCP-AG	DSDPQ-N-WL	AVFAPPITAR
P. involutus P. involutus T. pubescens A. pediades P. lycii	(phyA1) (phyA2)	LNAAAPGANL LNAGAPGANL LNqqAPGANI	TDaDAfNLvs TDtDTyNLlt TAaDvsNLip	LCPFmTVSkE LCPFETVAtE LCAFETIvkE	kksdFCtLFE qksdFCtLFE rrseFCDIYE tpspFCNLF. naspFCDLF.	giPGsFeAFa elQAE.dAFa .tPEEFaqFe

LNAAAPGANL TD-DA-NL-- LCPFETVS-E --S-FCDLFE --PEEF-AF-

APPROVED O.G. FIG.
BY CLASS SUBCLASS
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P. involutus (phyA1) P. involutus (phyA2) T. pubescens A. pediades P. lycii Basidio	YaGDLDKFYG YnADLDKFYG YfGDLDKFYG	TGYGQALGPV TGYGQPLGPV TGYGQPLGPV TGPGNALGPV	OGAGANETT OGAGAINETT OGAGAINETT	ARLTnsAVnD ARLTaQnVsD ARLTemPVRD ARLTgQAVRD	NTQTNRTLDA HTQTNsTLDS NTQTNRTLDS ETQTNRTLDS
P. involutus (phyA1) P. involutus (phyA2) T. pubescens A. pediades P. lycii	APdTFPLNKT SPeTFPLNRT SP1TFPLDRS dPaTFPLNRT	MYADFSHDN1 LYADFSHDNQ IYADLSHDNQ FYADFSHDNt	MVAVFSAMGL MVAIFSAMGL MIAIFSAMGL MVPIFAALGL	FrQSAPLSTS FNQSAPLDPT FNQSSPLDPS FNaTA.LDP1	tPDPNRTWLT tPDPaRTFLv fPNPKRTWVT kPDeNR1WVd
Basidio	SP-TFPLNRT	FYADFSHDNQ	MVAIFSAMGL	FNQSAPLDPS	-PDPNRTWVT
P. involutus (phyA1) P. involutus (phyA2) T. pubescens A. pediades	SsVVPFSARM kKIVPFSARM SRLtPFSARM	aVERLsCa VVERLdCg	GTGA	tkV	RVLVQDqVQP RLLVNDAVQP
P. lycii		tVEKLaC		sgkeaV	RVLVNDAVQP
P. lycii Basidio		tVEKLaC	GT	sgkeaV	RVLVNDAVQP
Basidio P. involutus (phyA1)	SKLVPFSARM 401 LEFCGGDTNG LEFCGGDQDG LAFCGADtsG LKFCGGDmDS	tVEKLaC VVERL-C 1CTLAkFVES 1CALDkFVES VCTLDAFVES 1CTLEAFVES	GT QtFARsDGaG	sgkeaV v 4 DFEKCFATSa DFEKCLATTV DFEKCFAT~~	RVLVNDAVQP RVLVNDAVQP 41 ~ ~ ~ ~

APPROVED O.G. FIG.

8Y CLASS SUBCLASS
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	1				50
A. terreus 9al		GYOCEPELSH	kWGlYAPYFS	LqDESPFPlD	VPeDCHITFV
A. terreus cbs	NhsdCtSVDr	GYOCEPELSH	kWGlYAPYFS	LqDESPFPlD	VPdDCHITFV
A. niger var. awamori	NastCDTVDa	GYOCESETSH	LWGOYAPFFS	LANESAISPD	VPaGCRVTFa
A. niger NRRL3135	NassCDTVDa	GYOCESELSH	LWGOYAPFFS	LANESVISPE	VPaGCRVTFa
A. fumigatus 13073	GSkSCDTVD1	GYOCSPAtSH	LWGOYSPFFS	LEDELSVSSK	LPkDCRITLV
A. fumigatus 32722	GSkSCDTVD1	GYOCSPAtSH	LWGOYSPFFS	LEDElSVSSK	LPkDCRITLV
A. fumigatus 58128	GSkSCDTVDl	GYOCsPAtSH	LWGQYSPFFS	LEDELSVSSK	LPkDCRITLV
A. fumigatus 26906	GSkSCDTVDl	GYOCSPAtSH	LWGQYSPFFS	LEDELSVSSK	LPkDCRITLV
A. fumigatus 32239	GSkACDTVEl	GYQCsPGtSH	LWGQYSPFFS	LEDElSVSSD	LPkDCRVTFV
E. nidulans	ONHSCNTaDG	GYQCfPNVSH	VWGQYSPYFS	IEQESAISeD	VPhGCeVTFV
T. thermophilus	DSHSCNTVEG	GYQCrPEISH	sWGQYSPFFS	LADQSEISPD	VPqNCKITFV
T. lanuginosus	~~~~~~	~ ~~~nvDIA	R hwgqyspffs	S LAEVSEISPA	VPkGCRVeFV
M. thermophila	ESRPCDTpDl	GFQCgTAISH	FWGQYSPYFS	VPsElDaS	IPdDCeVTFa
Basidio	xSxPxrxtAA	qLPipxQxqx	xWSPYSPYFP	VAxyxA	pPaGCQIxqV
Consensus	NSHSCDTVDG	GYQC-PEISH	LWGQYSPFFS	LADESAISPD	VP-GCRVTFV
Fcp10	NSHSCDTVDG	GYQCFPEISH	LWGQYSPFFS	LADESAISPD	VPKGCRVTFV
	51				100
A. terreus 9al	QVLARHGARs	PThSKTKaYA	AtlaAlQKSA	TafpGKYAFL	QSYNYSLDSE
A. terreus cbs	QVLARHGARs	PTdSKTKaYA	AtlaAlQKNA	TalpGKYAFL	KSYNYSMGSE
A. niger var. awamori	QVLSRHGARY	PTeSKGKKYS	ALIEEIQQNV	TEFDGKYAFL	KTYNYSLGAD
A. niger NRRL3135				TtFDGKYAFL	
A. fumigatus 13073				TdFKGKFAFL	
A. fumigatus 32722				TdFKGKFAFL	
A. fumigatus 58128	QVLSRHGARY	PTSSKSKKYK	KLVTAIQANA	Tdfkgkfafl Tdfkgkfafl	KTINIILGAD
A. fumigatus 26906				TefkGKFAFL	
A. fumigatus 32239				TsFwGQYAFL	
E. nidulans				TaYKGyYAFL	
T. thermophilus	ONI CDUCARI	V DAYPKELIS AISSVIETIS	quisiiqaca A Filarianti	TAIKGYIAFI A TAFKCDFAFI	L RdYaYhLGAD
T. lanuginosus	OVI CDUCADA	THINGEVIA	DI.IdrIHbGA	isYgPgYEFL	RTYDYTLGAD
M. thermophila Basidio	NTIGDUCADE	PTCC=AtPic	AaVakI.Osax	xxtDPKLDFL	xnxt.YxI.GxD
Basidio	MIIQMOAKI	riboanchiq	navanngban	70102110212	
Consensus	OVLSRHGARY	PTSSKSKKYS	ALI-AIOKNA	T-FKGKYAFL	KTYNYTLGAD
Fcp10	OVLSRHGARY	PTSSKSKKYS	ALIEAIQKNA	TAFKGKYAFL	KTYNYTLGAD
1021	•		~		
	101				150
A. terreus 9al	ELTPFGrNQL	rDlGaQFYeR	YNAL.TRhIn	PFVRATDAsR	VhESAEKFVE
A. terreus cbs				PFVRAADSsR	
A. niger var. awamori	DLTPFGEQEL	VNSGIKFYQR	YESL.TRnII	PFIRSSGSsR	VIASGEKFIE
A. niger NRRL3135				PFIRSSGSsR	
A. fumigatus 13073				PFIRASGSDR	
A. fumigatus 32722		-		PFIRASGSDR	
A. fumigatus 58128				PFIRASGSDR	
A. fumigatus 26906				PFIRASGSDR	
A. fumigatus 32239				PFIRSSGSDR	
E. nidulans				PFIRASGSDR	
T. thermophilus				PFVRCSGSDR	
T. lanuginosus					R VIASAEfFnr
M. thermophila				PFVRTAGqDR	
Basidio	DIVELGHXÖS	echodear ck	TSYNASYMIN	PFVRASGSDR	VVDSACINACA
Consensus	D⊺.Ͳ₽₽₽₽₽∩∩M	MAGIKEADD	YKAIAR-TV	PFVRASGSDR	VIASAEKETE
Coņsensus Fcp10				PFVRASGSDR	
rcp10	THIELGEGÖM	VADGIRFIRR	- TVALL - SALET V	- F TIMEGEDR	· acrossible Ali

APPROVED	0.G. F	FIG.
8Y	CLASS	SUBCLASS
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	11/30
1	200 51 St
	VALUE ODODE VIDVATDEGSA YNNTLEHSLU TAFESSU
A. CCIICU	
A. niger var. awamori	GFQNARQGDP HANDNOPSPT VDVVIFEGAR TANDEDGEC TVFEGSE GFQSTKLkDP rAqpgQSSPk IDVVISEASS SNNTLDPGtC TVFEGSE GFQSTKLkDP rAqpgQSSPk IDVVISEASS SNNTLDPGtC TVFEGSO
A. niger NRRL3135	GFQSTKLKDP TAQPQSSTA ISVITESET FNNTLDHGVC TKFEaSQ
A. fumigatus 13073	GFQQAKLADP GAT.NRAAPA ISVIIPESET FNNTLDHGVC TKFEASQ GFQQAKLADP GAT.NRAAPA ISVIIPESET FNNTLDHGVC TKFEASQ
A. fumigatus 32722	GFQQAKLADP gAt.nRAAPa ISVIIPESEI FNVIEDHGUG TKFEa SO
A. fumigatus 58128	GFQQAKLADP GAT.NRAAPA ISVIIPESET FNNTLDHGVC TKFEASQ GFQQAKLADP GAT.NRAAPA ISVIIPESET FNNTLDHGVC TKFEASQ
A. fumigatus 26906	TO TO THE STANDS ISVITUESET FUNITIONS OF THE STANDS
A. fumigatus 32239	
A. Fulligacus 52255	TO THE TOTAL PROPERTY OF THE P
E. nidulans	1 A MILEDANDE TIMITI ARCEDS YNNI LLDUGGO I VI DO I I I D
T. thermophilus	
T. lanuginosus	TALLOS IN TORNAL TALLOS IN TALLOS IN TORNAL TALLOS IN TORNAL TALLOS IN TERNAL TALLOS IN ENDENTE TALLOS INTENDENTE TALLOS INTENDENTE TALLOS INTENDENTE TALLOS INTENDENTE TALLOS INTE
M. thermophila	GFAXA SXNTXXPX LXVILSEXGNDTLDDNMCPXAG
Basidio	GFAXA
	GFQSAKLADP -AQASPV INVIIPEG-G YNNTLDHGLC TAFEL - SE
Consensus	GFQSAKLADP -AQASPV INVITEEGG INVITEEGG INVITEEGG INVITEEGG INVITEEGG INVITEEGG INVITEEGG INVITEEGG INVITEEGG
Fcp10	GFQSAKLADP GANPHQASPV INVIIPEGAG YNNTLDHGLC TAFEESE
_	250
A. terreus 9al	VGDDavANFT AVFAPAIaqR LEAGLPGVQL StDDVVNLMA MCPFETVS1T
A. terreus sar	
A. terreus Cos	TENDISCOND PRODUCTION TENDISCOVER TO THE PRODUCTION OF THE PRODUCT
A. niger var. awamori	LADIVEANFT ATFAPSIRGE LENGLISGVIL TOTEVLYLMD MCSFDTISTS LADIVEANFT ATFAPSIRGE LENGLISGVIL TOTEVLYLMD MCSFDTVART
A. niger NRRL3135	A TENDATOR AT EXPAINED A EKNIPCIVEL TOEDVVSIMD MCDIDIVILL
A. fumigatus 13073	
A. fumigatus 32722	ALEADAIDAD AERADAIDAD AERALPGVEL TDEDVVSLMD MCSFDIVALI
A. fumigatus 58128	LGDEVAANFT ALFAPDIRAR aKKhLPGVtL TDEDVVSLMD MCSFDTVArT
A. fumigatus 26906	LGDEVAANFT ALFAPAIRAR IEKhLPGVQL TDDDVVSLMD MCSFDTVArT LGDEVEANFT ALFAPAIRAR IEKhLPGVQL TDDDVVSLMD MCSFDTMArT
A. fumigatus 32239	LGDEVEANFT ALFAPAIRAR TERRILEGGUE THENVILLED MCSFDTMArT
E. nidulans	radeleanft almgppirkr Lendlpgikl TNENVIyLMD MCSFDTMArT
T. thermophilus	gGHDaQEKFA kqFAPAIlEK IKDhLPGVDL AvsDVpyLMD LCPFETLArn
T. lanuginosus	- ADDI STECODITIVE TERNMOGVAL TIEDVOIFID DOFFDIVORG
M. thermophila	TO THE REPORT OF THE PROPERTY
Basidio	dSDpqxnxWl AVFAPPItAR LNAaaPGaNL TDxDaxNLxx LCPFETVS
Basidio	
Consensus	LGDDVEANFT AVFAPPIRAR LEA-LPGVNL TDEDVVNLMD MCPFDTVA-T
=	LGDDVEANFT AVFAPPIRAR LEAHLPGVNL TDEDVVNLMD MCPFDTVART
Fcp10	IGDD V BARR 1 1111-15 - 1111-15
	300
	dDAhtLSPF CDLFTatE WtQYNYLISL dKYYGYGGGN
A. terreus 9al	TODE CDIETA AE WEOYNYLISH GRIIGIGGON
A. terreus cbs	i TvDTK LSPF CDLFTHdE WiHYDYLQSL kKYYGHGAGN
A. niger var. awamor	TVDTKLSPF CDLFTHdE WiNYDYLQSL kKYYGHGAGN
A. niger NRRL3135	TvDTKLSPF CDLFTHdE WINIDINGSD MXYYGYGAGN
A. fumigatus 13073	SD. ASQ LSPF COLFTH. NE WKKYNYLQSL GKYYGYGAGN
A. fumigatus 32722	OD ACO ISPE CONFIDENCE WANTED DOD DICTORDED
A. fumigatus 58128	TIGHT COLFTH. THE WKKYNILOSH GRIIGIGAGN
A. fumigatus 26906	I SPE COLFTH NE WKKINILOSL GRIIGIGAGN
A. fumigatus 32239	TOPE CATETH, HE WERYDYLOSL GRIGGAGN
	LSPF CAIFTEKE WIQYDYLQSL SKIIGIGAGS
E. nidulans	ISPE CALSTO EE WGaIDIIQSE GRIIGHGGG
T. thermophilus	1.SPF CHLFTadD wmayDryyTL dkiishddds
T. lanuginosus	G-d-ATAGA GARGEDISPF CrLFSEsE WrayDyLQSV GRWIGIGEGN
M. thermophila	SSAPATAGAG GGIGTPESTT OFFICE FXAFXYXGGL GKFYGtGyGQ
Basidio	
	SDATQLSPF CDLFTHE W-QYDYLQSL -KYYGYGAGN
Consensus	SDATQ LGPF CDLFTH DE WTOYDVI.OSL GKYYGYGAGN
Fcp1	SD-ATQLSPF CDLFTHDE WIQYDYLQSL GKYYGYGAGN

APPROVED O.G. FIG.
BY CLASS SUBCLASS
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	201				350
2 4 0-1	301	-MEI MADI TO	A DIMIDUTC'S	NNTLDASPAT	
A. terreus 9a1				NNTLDANPAT	
A. terreus cbs A. niger var. awamori	PLGPVQGVGW	ONELIARDIR	C DUMUNITO	MUTIDANIAI	PDI.NGTI.VAD
				NHTLDSSPAT	
A. niger NRRL3135				NATLVSNPAT	
A. fumigatus 13073				NSTLVSNPAT	
A. fumigatus 32722					
A. fumigatus 58128				NSTLVSNPAT	
A. fumigatus 26906				NsTLvSNPAT	
A. fumigatus 32239				NSTLDSDPAT	
E. nidulans				NHTLDSNPAT	
T. thermophilus				NHTLDSNPAT	
T. lanuginosus					FPLDAvLYAD
M. thermophila				NRTLDGDPrT	
Basidio	PLGPvQGVGY	iNELLARLTx	qa.VRDNTqT	NRTLDSSPxT	FPLNrTFYAD
Consensus				NHTLDSNPAT	
Fcp10	PLGPAQGVGF	VNELIARLTH	S.PVQDHTST	NHTLDSNPAT	FPLNATLYAD
	351				400
A. terreus 9al		FWALGLYNGT			AAWTVPFAAR
A. terreus cbs		FWALGLYNGT			AAWTVPFAAR
A. niger var. awamori					SAWTVPFASR
A. niger NRRL3135	FSHDNGIISI	LFALGLYNGT	kPLSTTTVE.	-	SAWTVPFASR
A. fumigatus 13073		FFALGLYNGT			ASWvVPFGAR
A. fumigatus 32722	FSHDNSMVSI	FFALGLYNGT	gPLSrTSVE.		ASW√VPFGAR
A. fumigatus 58128	FSHDNSMVSI	FFALGLYNGT	ePLSrTSVE.	.SaKElDGYS	ASWvVPFGAR
A. fumigatus 26906	FSHDNSMVSI	FFALGLYNGT	ePLSrTSVE.		ASWvVPFGAR
A. fumigatus 32239			ePLSqTSeE.		ASWAVPFGAR
E. nidulans	FSHDNSMISI	FFAMGLYNGT	qPLSmdSVE.	.SiQEmDGYA	ASWTVPFGAR
T. thermophilus			akLSTTeIK.		AAWTVPFGGR
T. lanuginosus	FSHDNTMtG:	I Fsamglyng	r kPLSTSkIQ	P pTgAAADGYA	A ASWTVPFAAR
M. thermophila	FSHDNdMMGV	LgALGaYDGv	pPLdkTAR	rdpEElGGYA	ASWAVPFAAR
Basidio	FSHDNqMVAI	FsAMGLFNqS	aPLdPSxpDP	$\mathtt{nrt} \dots \mathtt{W} \mathtt{v}$	TSklVPFSAR
·					
Consensus				-S-EETDGYA	
Fcp10	FSHDNTMVSI	FFALGLYNGT	KPLSTTSVE.	.SIEETDGYA	ASWTVPFAAR
	401				450
A. terreus 9al				VRVLVNDRVM	
A. terreus cbs	AYIEMMQC	ra	EKQPL	VRVLVNDRVM	PLHGCAVDNL
A. niger var. awamori	lyvemmqc	Qa	EQEPL	VRVLVNDRVV	PLHGCPIDaL
A. niger NRRL3135	lyvemmqc	Qa	EQEPL	VRVLVNDRVV	PLHGCPVDaL
A. fumigatus 13073	AYfEtMQC	Ks	EKEPL	VRaLINDRVV	PLHGCDVDKL
A. fumigatus 32722	AYfEtMQC	Ks	EKEPL	VRaLINDRVV	PLHGCDVDKL
A. fumigatus 58128	AYfEtMQC	Ks	EKESL	VRaLINDRVV	PLHGCDVDKL
A. fumigatus 26906	AYfEtMQC	Ks	EKEPL	VRaLINDRVV	PLHGCDVDKL
A. fumigatus 32239				VRaLINDRVV	
E. nidulans	_			VRVLVNDRVV	
T. thermophilus				VRVLVNDRVV	
T. lanuginosus					V PLHGCrVDRW
M. thermophila				VRVLVNDRVM	
Basidio	mvVErLxCxx	xqtxxxxxx	xxxxxxxx	VRVLVNDaVq	PLEfCGgDxd
		_		. 4	J
Consensus	AYVEMMQC	E	EGEKEPL	VRVLVNDRVV	PLHGCGVDKL
Fcp10				VRVLVNDRVV	
2					

	451		4	82
A. terreus 9a1	GRCKrDAFVA	GLSFAQAG	GNWADCF~~~	~~
A. terreus cbs	GRCKrDDFVE	GLSFARAG	GNWAECF~~~	~~
A. niger var. awamori	GRCtrDsFVr	GLSFARSG	GDWAECsA~~	~~
A. niger NRRL3135	GRCtrDsFVr	GLSFARSG	GDWAECFA~~	~~
A. fumigatus 13073	GRCKINDFVK	GLSWARSG	GNWGECFS~~	~~
A. fumigatus 32722	GRCKINDFVK	GLSWARSG	GNWGECFS~~	~~
A. fumigatus 58128	GRCKINDFVK	GLSWARSG	GNWGECFS~~	~~
A. fumigatus 26906	GRCKINDFVK	GLSWARSG	GNWGECFS~~	~~
A. fumigatus 32239	GRCKlKDFVK	GLSWARSG	GNSEQSFS~~	~~
E. nidulans	GRCtlDDWVE	GLNFARSG	GNWKtCFT1~	~~
T. thermophilus	GRCKrDDFVr	GLSFARqG	GNWEGCYAas	_
T. lanuginosus	GRCRrDEWIF	GLTFARqG.	. GHWDrCF~~	~ ~-
M. thermophila	GmCtlErFIE	SMAFARGN	GKWDlCFA~~	~~
Basidio	GxCtlDAFVE	SqxYAReDgq	GDFEKCFAtp	хх
Consensus	GRCK-DDFVE	GLSFARSG	GNWEECFA	
Fcp10	GRCKRDDFVE	GLSFARSG	GNWEECFA	• •

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₽Y	CLASS	SUBCLASS
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						v															17
	TATAI																				
_																					60
•	ATATA	ACTI	ГАА	GTA(CCC	GCA	CAA	GCA	GCA	CGA	TGA	CAG	GTA	ACG	GTG	GAA	CAA	GCC	AAG	ЗT	
	S	G	Т	Α	L	G	P	R	G	N	S	H	S	С	D	T	V	D	G	G	37
•	CATC	:GG1	rac(CGC	CTT	GGG'	TCC'	TCG	TGG	TAA	TTC	TCA	CTC	TTG	TGA	CAC	TGT	TGA	CGG:	ГG	
61			+				+	- 		-+-			+				+			-+	120
(GTAGG	CP-	-	GCG(GAA	CCC	AGG.	AGC.	ACC.	ATT.	AAG	AGT	GAG	AAC	ACT	GTG	ACA	ACT	GCC	AC	
			-		3.1	_															
	Y	Q	C	F	Ρ	E	I	S	H	L	W	G	Q	Y	S	P	F	F	S	L	57
(GTTAC	CAZ	YTG!	rtt(CCC	AGA	AAT'	TTC'	TCA	CTT	GTG	GGG'	TCA	ATA	CTC	TCC	ATT	CTT	CTC	ГT	
121			+				+			-+-			+				+			-+	180
(CAATO	GT'	rac:	AAA	GGG'	TCT:	TTA	AAG.	AGT	GA A	CAC	CCC	AGT	TAT	GAG	AGG	TAA	GAA	GAG	AΑ	
	_	_	_	_	_	_	_	_	_		_		_	_	_		_	_		_	
	===	D										_									77
	TGGCI																				
																					240
i	ACCGA	ACTO	3C'I".	rag					rct	GCA.	AGG	TTT	CCC	GAC	ATC	TCA	ATG.	AAA	GCA	4G	
						CP-															
							_	P-5													
																			S		97
	AAGTT																				
																					300
	TTCAA	LAAC	CAG	ATC:	TGT	GCC	ACG	ATC'	rat(GGG'	TTG.	AAG	AAG.	ATT	CAG.	ATT	CTT	CAT	GAG	/C	
	L	I	E	A	I	Q	K	N	Α	T	A	F	K	G	K	Y	A	F	L	K	117
	CTTTG																				
																					360
(GAAAC	TAP	ACT.	rcg/	ATA	AGT:	TTT(CTT			ACG.	AAA	GTT	CCC	ATT	CAT	GCG.	AAA	GAA	CT	
									CP	-6											
												7.1									
	${f T}$	Y	N	Y	T	L	G	A	D	D	L	T	P	F	G	E	Q	Q	M	V	137
1	AGACI	TAC	CAAC	CTA	CAC'	TTT	GGG'	TGC'	rga(CGA	CTT	GAC'	rcc.	ATT	CGG	TGA.	ACA.	ACA.	AAT	3G	
361			+ -				+			-+-			+				+			- +	420
	TCTGA	ATG	TT	JAT(GTG	AAA	CCC	ACG	ACT	GCT(GAA	CTG	AGG'	TAA	GCC.	ACT'	T GT'	TGT'	TTAC	CC	
	N	S	G	Ι	K	F	Y	R	R	Y	K	Α	L	Α	R	K	I	V	P	F	157
	TTAAC	TCT	rgg:	CAT:	raa(GTT(CTA	CAG	AAG	ATA	CAA	GGC'	rtt(GGC'	TAG.	AAA	GAT'	TGT'	TCC	\mathbf{T}^{\prime}	
421			-+-				+			-+-			+				+		- -	+	480
7	AATTG	AGA	ACC	ATA	TTA	CAAC	GAT(GTC'	rrc'	TAT	GTT	CCG	AAA	CCG.	ATC	TTT	CTA	ACA.	AGG1	ľA.	
												CP	-8.	10							
													1	CP-	9.1	0					
	v	R	Α	s	G	s	D	R	v	I	Α	s	Α	E	K	F	I	E	G	F	177
	TCGTI													TGA.	AAA	GTT	CAT'	TGA.	AGG1	CT.	
481			+-				+ ·			-+-			+				+			-+	540
	AGCAA	TCI	CG2	AAG	ACC	AAG2	ACT	GTC'	rca.	ATA	ACG.	AAG	ACG.	ACT'	TTT	CAA	GTA	ACT'	TCC	۱A	
	AGCAA	TCI	rcg2	AAG	ACC	AAG	ACT	GTC'	rca.	ATA	ACG.	AAG	ACG	ACT'	TTT	CAA	GTA	ACT'	TCC	λA	
																					197
į		s	Α	K	L	A	D	P	G	<u>A</u>	<u>N</u>	P	н	Q	Α	s	P	v	I	<u>N</u>	197
;	Q	S A TC I	A rgc:	K PAA G	L GTT(A GGC	D FGA (P CCC	G A GG :	<u>A</u> IGC:	<u>N</u> TAA	P CCC	H ACA	Q CCA	A AGC	S TTC	P TCC.	V AGT '	I TAT 1	<u>N</u> A 1	197 600

Fig. 5a

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AFTSMAH		

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																	_	CP-				
	V	I		I	P	E	G	<u>A</u>	G	Y	N	N	Т	L	D	Н		Ī				217
A	CGT	TA	TT.	ΑTΊ	CCZ	AGAZ	AGG'	rgc'	rgg:	rta(CAA	CAA	CAC'.	rtt(GGA	CCA	CGG'	LTT	3.I.G.	PACT	. G	660
_				-+- ma:		·	 TCC	+ :	·	 አልጥ(-+-·	 2444	: 2TG2	+ AAA:	 CCTC	·	GCC:	AAA	CAC	atga	AC.	000
.1	GCA	A.I.	AA	TAA	iGG.	ICI.	I CC	ACG.	ACC.	MAI.	911	311	3101	· ·								
	F	Ε		E				G												A		237
٥	TTT	CG	AA	_ GA	TC:	rga.	ATT	GGG'	TGA	CGA	CGT:	rga:	AGC'	CAA	CTT	CAC'	rgc'	rgt'	rtt(CGCI	ľC	
-	. -		- -	-+-	- - -	-		+			-+ -		- - - ·	+		 -		+	:		•+	720
G	AAA	.GC	TT	CT	CAG	ACT'	TAA	CCC	ACT	GCT	GCA	ACT'	rcg	ATT	GAA	GTG	ACG	ACA		GCGA		10
																			2	CP-1		10
	D	т		Ð	Δ	R	т.	Е	Α	н	L	P	G	v	N	L	т	D	E	D	v	257
•	E PACC	TA	тт	AGI	AGC'	TAG.	ATT	GGA.	AGC'	TCA	CTT	GCC	AGG'	TGT	TAA	CTT	GAC'	rga(CGA	AGAC	CG	
_	- -			-+-				+			- + -		- 	+	-	-		+	-		-+	780
G	TGG	ΑT	AA	TC:	rcg:	ATC'	TAA	CCT	TCG	AGT	GAA	CGG'	TCC:	ACA	ATT(GAA	CTG.	ACT	GCT'	TCT	3 C	
9	CP-1	3.	10			_		~	_	_	г.	TT.	17	7.	ם	T	c	ח	73.	т	0	277
	_ V	_ <u>N</u>		L	M	D	M CD T	C	maa P	F.		T.	v Tanı	A TCC	ተልር	י אארי	יט יייטריי	TGA:	רפרי רפרי	T TACI	יב דכ	27,
7	rtgi	"I'A	AC	TT	JAT'	GGA	CAT	G1G	TCC.	 WTT	-+-			+				+			-+	840
7	מים מ	די ב	 тс	- - -	בידי:	ССТ	GTA	T CAC	AGG	TAA	GCT	GTG	ACA	ACG	ATC	TTG	AAG	ACT	GCG.	ATG	AG	
_	27.02		-																			
	L	S	;	P	F	C	D	L	F	T	Н	D	E	W	I	Q	Y	D	Y	L	~	297
2	LTA	GI	'CT	CC	TTA	CTG	TGA	CTT	GTT	CAC	TCA	CGA	CGA	ATG	GAT	TCA	ATA	CGA	CTA	CTT	ЗC	
	- -		- -	-+	 -		-	+	- - -		-+-			+				+			-+	900
-	rta <i>r</i>	ACA					ACT	GAA	CAA	GTG	AGT	GCT	GCT	TAC	CTA	AGT	TAT	GCT	GAT	GAA	J.G	
			CP) <u>- 1</u>	4 . 1	_	10															
	s	т		G			.10 v		Y	G	А	G	N	P	L	G	P	A	Q	G	V	317
	ב סידע		יטעה י	ن اظرة	'' Aat	GTA	.CTA	.CGG	TTA	.CGG	TGC	TGG	TAA	CCC	ATT:	GGG	TCC	AGC	TCA	AGG	ГG	
				-+				+			-+-			+	. – –			+			-+	960
	TTAC	AA	AC	CC.	ATT	CAT	'GAT	GCC	AAT	GCC	AC G	ACC	ATT	GGG	TAA	.CCC	AGG	TCG	AGT	TCC	AC	
														_	_		_	_		m	_	227
	G	F	7	$\overline{\Lambda}$	N	E		Ι	A	R	L 	T	_ <u>H</u>	S	P	V	Q	D	H			337
	TTG	3T'1	TC	GT'	TAA	CGA	ATT	'GA'I	TGC	TAG	ATT	GAC	TCA	CTC		AG 1	1 CA	AGA 		CAC'	-+	1020
				· - +	~ ~ ~ ~	 CC	ממחיי	+ מידים		ידע:	ב אידי! ממידי!	CTG	AGT	GAG	AGG	TCA	AGT	TCT	GGT	GTG	AA	1020
4	AAC	_P\F	17-1C	CA	WII	GCI		16.														
								CF	-17	.10)											
	т	1	1	Н	Т	L	D	S	N	P	Α	${f T}$	F	P	L	N	A	T	L	Y	Α	357
	CTA	CTA	AA	CCA	CAC	TTT	GGA	CTC	TAA	CCC	'AGC	TAC	TTT	'CCC	TTA	'GAA	CGC	TAC	TTT	'GTA	CG	1000
				+				+	- - -	. 	-+-			+				+			-+	1080
	GAT	GA!	CTC	3GT	GTG	AAA	CCI	GAG	PTA	'GGG	FTCG	ATG	AAA	(GGG	TAA	CT-1	.GCC	ATG	AAA	CAT	GC	
	τ.	,	7	c	ц	ת	N	т	м	v	S	т	F	F	Α	L	G	L	Y	N	G	377
	ייים בייים	ו ארטיים	: ኮጥ <i>(</i>	ט ייייניי	ת ייירים	CGZ	CAZ	ACAC	TAT	GG:	TTC	TAT	TTT	CTI	rcgc	_ TTI	rgge	- TTT	GTA	CAA	.CG	
				+	-	-		- +		- - -	+-	. – – -			+			+	-		-+	1140
	GAC'	TGZ	AA(GAG	AGI	GC7	rgT7	rgTC	TA	ACCI	AAA	ATA	AAA	GA	AGCG	AA	YGG(AAA!	CAT	GTT	GC	
											-18.	10										
								_				:P-1	. <u>9.1</u> -	<u>.0</u>			-	~	٦,	75	~	207
	T		<u>K</u>	P	L	S	T	T	S	V	E	S	ת תוחה	E PTC:	E Laci	ד. דע ע.	ייבותה ניבותה	G Var	د شائة آ	GGC	A יTC	397
	GTA	CT)	AA(JCC 	AT1	rGT(A(- T.A(- T.I.(. I G	 		A l		+		·	· +			-+	1200
																						1200

Fig. 5b

APPROVED	0.G. f	FIG.
87	CLASS	SUBCLASS
DRAFTSHAN		

	s	W	т	v	P	F	A	A	R	A	Y	v	E	M	M	Q	С	E	A	E	417
	CTTC	TTG	GAC	TGT	TCC.	ATT	CGC	TGC'	TAG.	AGC	TTA	CGT'	TGA	AAT	GAT	GCA	ATG	TGA	AGC	TG	
1201		-	+		-	-	+			-+-			+				+			-+	1260
	GAAG	AAC	CTG.	ACA	AGG	TAA	GCC.	ACG.	ATC'	TCG.	AAT	G CA	ACT	TTA	CTA	CGT	TAC	ACT	TCG	AC	
												CP	-20	.10							
														CP-	21.	10					
	K	E	P	L	v	R	v	L	v	N	D	R	v	v	P	L	H	G	С	G	437
	AAAA	GGA	ACC.	ATT	GGT'	TAG	AGT'	TTT	GGT'	TAA	CGA	CAG	AGT	TGT	TCC	ATT	GCA	CGG	TTG	TG	
1261			+				+														1320
	TTTT	CCT	TGG	TAA	CCA	ATC'	TCA.	AAA	CCA	ATT	GCT	GTC'	TCA	ACA	AGG	TAA	CGT	GCC	AAC	AC	
	v	D	к	L	G	Ŕ	С	ĸ	R	D	D	F	v	Е	G	L	s	F	A	R	457
	GTGT	_		_	_		_														
1321																					1380
1321	CACA				מממ																
	Cricri			C1 11 1					010								2.1			_	
	c	G	G	N	TAT	F	묘	C	묘	Δ	*	EC	o P	т	_	4		<u> </u>			
	GATC					_								_		_	0,				
1381		100	166	IAA	CIG	GGA.	non.			- + -							26				
1281			+				+			- - -							20				
	CTAG	ACC.	ACC.	ATT.	GAC	CC.I.	TCI	TAC	HHA	جاتات.	HAT.	TCT.	TWW	GIA	TWI						

PROVED O.G. FIG.
BY CLASS SUBCLASS

		1			_	50
P.	involutus (phyA1)	~~~~~~~	~FPipeseqR	nWSPYSPYFP	LAEykA	pPaGCQInqV
P.	involutus (phyA2)	~~~~~~~	~FsipeseqR	nWSPYSPYFP	LAEykA	pPaGCeInqV
T.	pubescens	~~~~~~~	~LDvtRDVqQ	sWSmYSPYFP	aAtyvA	pPaSCQInqV
Α.	pediades	~~~~~~	~pffpPQIqD	sWAaYTPYYP	VqAyTP	pPKDCK1TqV
P.	lycii	~~~~~~~	~LPipAQnTs	nWGPYdPFFP	VEpyAA	pPEGCtVTqV
Α.	terreus 9al	KhsdCNSVDh	GYQCfPELSH	kWGlYAPYFS	LqDESPFPlD	VPEDCHITFV
A.	terreus cbs	NhsdCtSVDr	GYQCfPELSH	kWGlYAPYFS	LqDESPFP1D	VPDDCHITFV
A.	niger var. awamori	NqsTCDTVDq	GYQCfSEtSH	LWGQYAPFFS	LANESAISPD	VPaGCRVTFa
A .	niger T213	NqsSCDTVDq	GYQCfSEtSH	LWGQYAPFFS	LANESvISPD	VPaGCRVTFa
A.	niger NRRL3135	NqsSCDTVDq	GYQCfSEtSH	LWGQYAPFFS	LANESVISPE	VPaGCRVTFa
A.	fumigatus ATCC13073	GSkSCDTVDl	GYQCsPAtSH	LWGQYSPFFS	LEDE1SVSSK	LPKDCRITLV
	fumigatus ATCC32722	GSkSCDTVDl	GYQCsPAtSH	LWGQYSPFFS	LEDELSVSSK	LPKDCRITLV
Α.	fumigatus ATCC58128	GSkSCDTVDl	GYQCsPAtSH	LWGQYSPFFS	LEDElSVSSK	LPKDCRITLV
Α.	fumigatus ATCC26906	GSkSCDTVD1	GYQCsPAtSH	LWGQYSPFFS	LEDELSVSSK	LPKDCRITLV
	fumigatus ATCC32239	GSkACDTVEl	GYQCsPGtSH	LWGQYSPFFS	LEDE1SVSSD	LPKDCRVTFV
	nidulans	QNHSCNTaDg	GYQCf PNVSH	VWGQYSPYFS	IEQESAISeD	VPhGCeVTFV
т.	thermophilus	DSHSCNTVEg	GYQCrPEISH	sWGQYSPFFS	LADQSEISPD	VPQNCKITFV
	lanuqinosus	~~~~~~~	~ ~~~nvDIA	NWGQYSPFF	S LAEVSEISPA	A VPKGCRVeFV
	thermophila	ESRPCDTpD1	GFQCgTAISH	FWGQYSPYFS	VPsElDaS	IPDDCeVTFa
		-				
Cor	nsensus Seq. 11	NSHSCDTVD-	GYQC-PEISH	LWGQYSPFFS	LADESAISPD	VPKGCRVTFV
	_					
		51				100
P.	involutus (phyA1)	NIIqRHGARF	PTSGaTtRik	AgLtKLQgvq	nftDAKFnFI	KSFKYdLGns
	involutus (phyA1) involutus (phyA2)	NIIqRHGARF NIIqRHGARF	PTSGaAtRik	AgLsKLQsvq	nftDPKFDFI	KSFKYdLGns KSFtYdLGTs
P.		NIIQRHGARF NIIQRHGARF HIIQRHGARF	PTSGaAtRik PTSGaAKRiq	AgLsKLQsvq TaVAKLKaaS	nftDPKFDFI nytDPlLAFV	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD
$_{T}.$	involutus (phyA2)	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARF	PTSGaAtRik PTSGaAKRiq PTSGaGtRiq	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak	nftDPKFDFI nytDPlLAFV TytDPRLDFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD
P. T. A.	involutus (phyA2) pubescens	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARF NLIQRHGARW	PTSGaAtRik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA
P. T. A. P.	involutus (phyA2) pubescens pediades	NIIqRHGARF NIIqRHGARF HIIqRHGARF NIIqRHGARF NLIqRHGARW QVLARHGARS	PTSGaAtRik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE
P. T. A. P.	involutus (phyA2) pubescens pediades lycii	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARF NLIQRHGARW QVLARHGARS QVLARHGARS	PTSGaAtRik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA PTdSKTKaYA	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA	nftDPKFDFI nytDP1LAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TaLpGKYAFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE
P. T. A. P. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW OVLARHGARS OVLARHGARS OVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtriq PTSGarsRqv PThSKTKaYA PTGSKTKAYA PTESKGKKYS	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TaLpGKYAFL TtFDGKYAFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD
P. T. A. P. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW OVLLARHGARS OVLLARHGARS OVLSRHGARY OVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtriq PTSGarsRqv PThSKTKaYA PTGSKTKAYA PTESKGKKYS PTESKGKKYS	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TaLpGKYAFL TtFDGKYAFL TtFDGKYAFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD
P. T. A. P. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKAYA PTGSKKKYAYA PTESKGKKYS PTESKGKKYS	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TaLpGKYAFL TtFDGKYAFL TtFDGKYAFL	KSFKYdLGns KSFtYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD
P. T. A. P. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKAYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTGSKGKKYS	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TaLpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL	KSFKYdLGns KSFTYDLGTS tnYTYSLGQD tnYTYTLGhD NdFVYKFGVA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD
P. T. A. P. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTGSKGKKYS PTSSKSKKYK PTSSKSKKYK	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL	KSFKYdLGns KSFTYDLGTS tnYTYSLGQD tnYTYTLGhD NdFVYKFGVA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD
P. T. A. P. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NLIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL	KSFKYdLGns KSFTYDLGTS tnYtYSLGQD tnYtYTLGhD NdFVYKFGVA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD
P. T. A. P. A. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128	NIIQRHGARF NIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PTHSKTKAYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL	KSFKYdLGns KSFTYDLGTS tnYtYSLGQD tnYtYTLGhD NdFVYKFGVA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD
P. T. A. P. A. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NLIQRHGARW QVLARHGARS QVLARHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL	KSFKYdLGns KSFTYDLGTS tnYtYSLGQD tnYtYTLGhD NdFVYKFGVA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD
P. T. A. P. A. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NLIQRHGARW QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA kLVtaIQANA KLVtaIQANA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TeFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD ETYNYTLGAD ESYNYTLGAD
P. T. A. A. A. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NLIQRHGARW QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA kLVtaIQANA KLVtaIQANA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TeFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD ETYNYTLGAD ESYNYTLGAD
P. T. A. A. A. A. A. A. A. T.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NLIQRHGARW QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGarsRqv PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK PTSSKSKKYK	AgLsKLQsvq TaVAKLKaaS AaVKKLQsak AaVAKIQmar AtIAaIQKSA AtIAaIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA kLVtaIQaNA kLVtaIQaNA kLVtaIQaNA kLVtaIQANA kLVtaIQKNA GLIEAIQKNA qLISRIQKKA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TaFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD ESYNYTLGAD KdyryqLGAN
P. T. A. A. A. A. A. A. T.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus lanuginosus	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK PTSSKSKKYK PTSSKSKYYK PTSSKSKKYK PTSSKSKYYK	AGLSKLQSVQ TAVAKLKAAS AAVKKLQSAK AAVAKIQMAR ATIAAIQKSA ATIAAIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA KLVTAIQANA KLVTAIQANA KLVTAIQANA KLVTAIQANA KLVTAIQANA GLIEAIQKNA GLIEAIQKNA QLISRIQKTA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TAFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD ETYNYTLGAD ESYNYTLGAD KdYrYqLGAN L RdyayhLGAD
P. T. A. A. A. A. A. A. T.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus	NIIQRHGARF NIIQRHGARF HIIQRHGARF HIIQRHGARF NIIQRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK PTSSKSKKYK PTSSKSKYYK PTSSKSKKYK PTSSKSKYYK	AGLSKLQSVQ TAVAKLKAAS AAVKKLQSAK AAVAKIQMAR ATIAAIQKSA ATIAAIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA KLVTAIQANA KLVTAIQANA KLVTAIQANA KLVTAIQANA KLVTAIQANA GLIEAIQKNA GLIEAIQKNA QLISRIQKTA	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TaFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD ETYNYTLGAD ESYNYTLGAD KdYrYqLGAN L RdyayhLGAD
P. T. A. A. A. A. A. A. T. T. M.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus lanuginosus	NIIqRHGARF NIIqRHGARF NIIqRHGARF HIIqRHGARF NIIqRHGARW QVLARHGARS QVLARHGARS QVLSRHGARY	PTSGaAtrik PTSGaAKRiq PTSGaGtRiq PTSGarsRqv PThSKTKaYA PTGSKKKYS PTESKGKKYS PTGSKGKKYS PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYk PTSSKSKKYK PTSSKSKYYK PTSSKSKYYK PTSKSKKYYK PTSSKSKYYK	AGLSKLQSVQ TAVAKLKAAS AAVKKLQSAK AAVAKIQMAR ATIAAIQKSA ATIAAIQKNA ALIEEIQQNV ALIEEIQQNV ALIEEIQQNA KLVTAIQANA KLVTAIQANA KLVTAIQANA KLVTAIQANA GLIEAIQKNA GLIEAIQKNA QLISRIQKTA A ELLQRIQDT	nftDPKFDFI nytDPlLAFV TytDPRLDFL PftDPKYEFL TaFpGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TtFDGKYAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TdFKGKFAFL TAFKGKFAFL	KSFKYdLGns KSFTYdLGTs tnYtYSLGqD tnYtYTLGhD NdFvYkFGvA QSYNYSLDSE KSYNYSMGSE KTYNYSLGAD KTYNYSLGAD KTYNYSLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD KTYNYTLGAD ETYNYTLGAD ESYNYTLGAD KdYrYqLGAN L RdyayhLGAD

APPROVED O.G. FIG.

BY CLASS SUBCLASS

DRAFTSHAN

		101				150
ח	involutus (phyA1)	DLvPFGAaQs	fDAGqEaFaR	YskLvSKNnL	PFIRAdGSDR	VVDSAtNWtA
P.	involutus (phyA2)	DITTOPEGABOR	fDAGLEVFaR	YskLvSsDnL	PFIRSdGSDR	VVDTATNWTA
P.	pubescens	CI TOI CATOS	sEAGGEaFtR	YsSLvSaDeL	PFVRASGSDR*	VVATANNWEA
		DIMPEGATOS	SOAGEELFOR	YsfLvSKEnL	PFVRASSSNR	VVDSAtNWtE
	pediades	DI I DECANOS	hOTGEDMYER	YsTLfEqGdV	PFVRAAGdQR	VVDSSENWEA
	lycii	FI.TDFC~NOI.	rD1GaOFYeR	YNAL.TRHIn	PFVRATDASK	VNESAEKFVE
	terreus 9a1	MI.TDECTNOI.	ani Gaofyrr	YDTL.TRHIn	PFVRAADSsR	Vhesaekeve
	terreus cbs	DITPEGEOFI	VNSGIKFYOR	YESL.TRNII	PFIRSSGSsR	VIASGERFIE
	niger var. awamori	DITERCECET	VNSGTKFYOR	YESL.TRNII	PFIRSSGSSR	VIASGERFIE
	niger T213	DITERCECEI.	VNSGTKFYOR	YESL.TRNIV	PFIRSSGSsR	VIASGKKFIE
Α.	niger NRRL3135	DITERRITORIA	VNSGTKFYOR	YKAL.ARSVV	PFIRASGSDR	VIASGERFIE
Α.	fumigatus ATCC13073	חו יים דים דים ביים ביים ביים ביים ביים בי	VNSGTKEYOR	YKAL.ARSVV	PFIRASGSDR	VIASGEKFIE
Α.	fumigatus ATCC32722	DITFFGEQQU	VNSGIKEYOR	YKAL, ARSVV	PFIRASGSDR	VIASGEKFIE
Α.	fumigatus ATCC58128	DITTEGEOOI	MICCIKETOR	VKAT. ARSVV	PFIRASGSDR	VIASGEKFIE
A.	fumigatus ATCC26906	DLIAFGEQQU	MICCIKEVOK	VKAL AGSVV	PFIRSSGSDR	VIASGEKFIE
	fumigatus ATCC32239	DLTPFGEQQM	ANSGIKLIÖK	VKnI. ARKnt	PFIRASGSDR	VVASAEKFIN
	nidulans	DLTIFGENOM	VDSGakrikk	VKGI. ABNAV	PFVRCSGSDR	VIASGrlFIE
	thermophilus	DLTPFGENQM	IQIGIRFIIII	VDE~ ADET	V DEVRAAGSAE	VIASAEfFnr
	lanuginosus	NLTREGEEQ	MESGIQFINI	VDAT ADVET	PFVRTAGqDR	VVhSAENFtO
М.	thermophila	ELTREGQQQM	VNSGIKFIRR	IKALL.AKKSI	rrvinoqui	
				WAT ADMIN	PFVRASGSDR	VIASARKFIE
Co	nsensus Seq. 11	DLTPFGENQM	VNSGIKFYRR	YKAL-ARMIV	PF VKASGDDK	V 1110112111 ==
						200
		151	1 - m . m1	- NT TI DO	~NIDTE EDNMC	200
	involutus (phyA1)	CF2 SA	shNtvqPk	LNLILPQT	gndtlednmc	PAaGD
		GFaSA	srNaigPk	LDLILPQT	gNDTLEDNMC	PAaGD PAaGE
P.	involutus (phyA2)	GFaSA	srNaiqPk	LDLILPQT	gNDTLEDNMC gNDTLDDNMC	PAaGD PAaGE PAaGD
$_{T}.$	involutus (phyA2) pubescens	GFaSA GFaSA	srNaiqPk ssNsiTPV	LDLILPQT LSVIISEA LfVILSES	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC	PAaGD PAaGE PAaGD PnaGs
P. T. A.	involutus (phyA2)	GFaSA GFaSA GFalA	srNaiqPk ssNsiTPV shHvlNPI	LDLILPQT LSVIISEA LfVILSES LOVVLOEE	GNDTLEDNMC LNDTLDDAMC GNCTLCNNMC	PAaGD PAaGE PAaGD PnaGs PnevD
P. T. A. P.	involutus (phyA2) pubescens pediades	GFaSA GFaSA GFSAA GFSAA GFGDARGDDh	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVaIPEGSA	gndtlednmc gndtlddamc Lndtlddamc gnctlcnnmc ynntlehslc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST
P. T. A. P.	involutus (phyA2) pubescens pediades lycii terreus 9a1	GFaSA GFaIA GFSAA GFGDTARQDDD	srNaiqPk ssNsiTPV shHv1NPI sgEtv1Pt hAnpHQPSPr	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVaIPEGSA VDVVIPEGTA	gndtlednmc gndtlddnmc Lndtlddamc gnctlcnnmc ynntlehslc ynntlehslc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST
P. T. A. P. A.	involutus (phyA2) pubescens pediades lycii terreus 9a1 terreus cbs	GFaSA GFaIA GFsAA GFgdA GFQTARqDDh GFQNARqGDP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS	gndtlednmc gndtlddnmc Lndtlddamc gnctlcnnmc ynntlehslc ynntlehslc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST
P. T. A. P. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori	GFaSA GFaSA GFsAA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS	gndtlednmc gndtlddnmc Lndtlddamc gnctlcnnmc ynntlehslc ynntlehslc snntldpgtc snntldpgtc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe
P. T. A. P. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213	GFaSA GFaSA GFalA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP GFQSTKLkDP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS	gndtlednmc gndtlddnmc Lndtlddamc gnctlcnnmc ynntlehslc ynntlehslc snntldpgtc snntldpgtc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe
P. T. A. P. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135	GFaSA GFaSA GFalA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET	gndtlednmc gndtlddamc Lndtlddamc gnctlcnnmc ynntleHslc ynntleHslc snntldpGtc snntldpgtc snntldpgtc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq
P. T. A. P. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073	GFaSA GFaSA GFalA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQGAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET	gndtlednmc gndtlddamc Lndtlddamc gnctlcnnmc ynntleHslc ynntleHslc snntldpGtc snntldpgtc snntldpgtc fnntldhgvc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq
P. T. A. P. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722	GFaSA GFaSA GFalA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQqAKLADP GFQqAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET	gndtlednmc gndtlddamc Lndtlddamc gnctlcnnmc ynntleHslc ynntleHslc snntldpGtc snntldpGtc snntldpGtc fnntldhGvc fnntldhGvc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq
P. T. A. P. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128	GFaSA GFaSA GFalA GFgdA GFGTARQDDh GFQNARQGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET	gndtlednmc gndtlddamc Lndtlddamc gnctlcnnmc ynntlehslc ynntlehslc snntldpgtc snntldpgtc snntldpgtc fnntldhgvc fnntldhgvc fnntldhgvc	PAaGD PAaGE PAaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq TkFEASq
P. T. A. P. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC6906	GFaSA GFaSA GFalA GFgdA GFQTARqDDh GFQNARqGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQqAKLADP GFQqAKLADP GFQqAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC	PAaGD PAaGE PAaGE PaaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq
P. T. A. P. A. A. A. A. A.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC6906 fumigatus ATCC32239	GFaSA GFaSA GFalA GFgdA GFQTARQDDh GFQNARQGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHGVC YNNTLDHGVC FNNTLDHGVC	PAaGD PAaGE PAaGE PaaGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq
P. T. A. P. A. A. A. A. A. A. E.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans	GFaSA GFaSA GFalA GFgdA GFGTARQDDh GFQNARQGDP GFQSTKLkDP GFQSTKLkDP GFQGAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP	srNaiqPk ssNsiTPV shHvlNPI sgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET VNVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHSVC FNNTLDHSVC	PAaGD PAaGE PAaGE PAaGD PnaGS PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq TkFEASq
P. T. A. A. A. A. A. A. T.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus	GFaSA GFaSA GFalA GFgdA GFGDARQDDh GFQNARQGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQAKLADP	srNaiqPkssNsiTPVshHvlNPIsgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPA gAt.NRAAPA gAt.NRAAPA gAt.NRAAPA	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET VNVIIPESET INVIIPESET VNVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHSVC FNNTLDHSVC FNNTLDHSVC FNNTLDHSVC GNNTLDHSC GNNTLDHSC	PAAGD PAAGE PAAGE PAAGE PAAGD PnaGS PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TRFEASq
P. T. A. A. A. A. A. T. T.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus lanuginosus	GFaSA GFaSA GFalA GFgdA GFGDARQDDh GFQNARQGDP GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQAKLADP	srNaiqPkssNsiTPVshHvlNPIsgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPa gAt.NRAAPA gAt.NRAAPA gAt.NRAAPA gAt.NRAAPA	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET VNVIIPESET INVIIPESET VNVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHSVC FNNTLDHSVC FNNTLDHSVC FNNTLDHSVC GNNTLDHSC GNNTLDHSC	PAAGD PAAGE PAAGE PAAGE PAAGD PnaGS PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TKFEASq TRFEASq
P. T. A. A. A. A. A. T. T.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus	GFaSA GFaSA GFaSA GFgdA GFgdA GFQTARQDDh GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP	srNaiqPkssNsiTPVshHvlNPIsgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gSt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET	GNDTLEDNMC GNDTLDDNMC LNDTLDDAMC GNCTLCNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGCC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHSVC FNNTLDHSVC YNNTLDHSVC GNNTLDHSVC	PAAGD PAAGE PAAGE PAAGE PAAGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TKFEASq TKFEEASq TKFEASq
P. T. A. P. A. A. A. A. A. A. T. T. M.	involutus (phyA2) pubescens pediades lycii terreus 9al terreus cbs niger var. awamori niger T213 niger NRRL3135 fumigatus ATCC13073 fumigatus ATCC32722 fumigatus ATCC58128 fumigatus ATCC26906 fumigatus ATCC32239 nidulans thermophilus lanuginosus	GFaSA GFaSA GFaSA GFgdA GFgdA GFQTARQDDh GFQSTKLkDP GFQSTKLkDP GFQSTKLkDP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP GFQAKLADP	srNaiqPkssNsiTPVshHvlNPIsgEtvlPt hAnpHQPSPr hAnpHQPSPr rAqpgQSSPk rAqpgQSSPk rAqpgQSSPk gAt.NRAAPa gSt.NRAAPa	LDLILPQT LSVIISEA LfVILSES LQVVLQEE VDVAIPEGSA VDVVIPEGTA IDVVISEASS IDVVISEASS ISVIIPESET ISVIIPESET ISVIIPESET VNVIIPESET	gNDTLEDNMC gNDTLDDNMC LNDTLDDAMC gNcTLcNNMC YNNTLEHSLC YNNTLEHSLC SNNTLDPGtC SNNTLDPGtC SNNTLDPGtC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC FNNTLDHGVC YNNTLDHSVC FNNTLDHSVC FNNTLDHSVC FNNTLDHSVC GNNTLDHSC GNNTLDHSC	PAAGD PAAGE PAAGE PAAGE PAAGD PnaGs PnevD TAFESST TAFEAST TVFEDSe TVFEDSe TVFEDSe TKFEASq TKFEEASq TKFEASq

APPROVED		
BY	CLASS	SUBCLASS
DRAFTSMAN		

	250
	201
P. involutus (phyA1)	.SDpqvnaWl AVafPSItAR LNAaaPSVNL TDtDafNLVs LCAFITVSK.
P. involutus (phyA2)	.SDpqvDawl AsafPSVtAQ LNAaaPGaNL TDADafNLVs LCPFmTVSK.
T. pubescens	.SDpqvnQWl AqFAPPMtAR LNAgaPGaNL TDtDtyNLLt LCPFETVAt.
A. pediades	.SDpqtGiWT SIYGTPIanR LNqqaPGaNI TAADVSNLIP LCAFETIVK.
P. lycii	.GDESt.tWl GVFAPnitAR LNAaaPSaNL SDsDaLtLMD MCPFDTLSs.
A. terreus 9al	VGDDAVANFT AVFAPAIAQR LEAGLPGVQL StDDVVNLMA MCPFETVSlT
A. terreus cbs	VGDAAADNET AVEAPAIAKR LEAGLPGVQL SADDVVNLMA MCPFETVSIT
A. niger var. awamori	LADTVEANFT ATFAPSIRGR LENGLSGVTL TDTEVTYLMD MCSFDTISTS
A. niger T213	LADTVEANFT ATFAPSIRGR LENGLSGVTL TDTEVTYLMD MCSFDTISTS
A. niger NRRL3135	LADEVEANET AFFYPSIRGR LENGLISGVEL TOTEVELYLMD MCSFDTISTS
A. fumigatus ATCC13073	LODEVAANET ALEAPOLIRAR aEkhLPGVtL TDEDVVSLMD MCSFDTVART
A. fumigatus ATCC32722	LCDEVAANET ALFAPdIRAR aEkhLPGVtL TDEDVVSLMD MCSFDTVART
A. fumigatus ATCC58128	LCDEVAANET ALFAPOLIRAR aEKHLPGVtL TDEDVVSLMD MCSFDTVART
A. fumigatus ATCC26906	LCDEVAANET ALFAPDIRAR AKKHLPGVtL TDEDVVSLMD MCSFDTVART
A. fumigatus ATCC32239	LCDEVEANET ALFAPAIRAR IEKHLPGVQL TDDDVVSLMD MCSFDTVART
E. nidulans	FADELEANET AIMGPPIRKR LENGLPGIKL TNENVIYLMD MCSFDTMART
T. thermophilus	GGHDAOEKFA kGFAPAIlEK IKDhLPGVDL AvsDVpyLMD LCPFETLARn
T. Linermophilius T. lanuginosus	Dotonaffi gyfgprylkk itkhmpgynl TlEDVplfMD LCPFDTygsd
	IGDDAQDtYl StFAGPItAR VNAnLPGaNL TDADtVaLMD LCPFETVASS
M. thermophila	
Consensus Seq. 11	LGDDAEANFT AVFAPPIRAR LEA-LPGVNL TDEDVVNLMD MCPFDTVART
Consensus seq. 11	
	251
P involutus (phvA1)	251 ekksdF CtLFeqiPGs FeaFAYqqdL dKFYGtGyGQ
P. involutus (phyA1) P. involutus (phyA2)	251ekkSdF CtLFegiPGs FeaFAYggdL dKFYGtGyGQ egkSdF CtLFegiPGs FeaFAYagdL dKFYGtGyGQ
P. involutus (phyA2)	251ekkSdF CtLFegiPGs FeaFAYggdL dKFYGtGyGQeqkSdF CtLFegiPGs FeaFAYagdL dKFYGtGyGQ errSeF CDIYeelgAE .daFAYnadL dKFYGtGyGQ
P. involutus (phyA2) T. pubescens	251ekkSdF CtLFegiPGs FeaFAYggdL dKFYGtGyGQeqkSdF CtLFegiPGs FeaFAYagdL dKFYGtGyGQerrSeF CDIYeelqAE .daFAYnadL dKFYGtGyGQetpSPF CNLFTPEE FaOFEYFqdL dKFYGtGyGQ
P. involutus (phyA2) T. pubescens A. pediades	251ekkSdF CtLFegiPGs FeaFAYggdL dKFYGtGyGQeqkSdF CtLFegiPGs FeaFAYagdL dKFYGtGyGQerrSeF CDIYeelqAE .daFAYnadL dKFYGtGyGQetpSPF CNLFTPEE FaQFEYFgdL dKFYGtGyGQgnaSPF CDLFTAEE YvsYEYYydL dKYYGtGPGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii	ekkSdF CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdF CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSeF CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSPF CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSPF CDLF. TAEE YvsYEYYydL dKYYGtGPGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al	ekkSdF CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdF CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSeF CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSPF CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSPF CDLF. TAEE YVSYEYYYGL dKYYGTGGN dD Aht LSPF CDLF. TAEE WtQYNYLISL dKYYGYGGGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSPf CDLF. TAEE YVSYEYYYGL dKYYGTGPGN dD. Aht LSPF CDLF. TATE WtQYNYLISL dKYYGYGGGN dD. Aht LSPF CDLF. TAAE WtQYNYLISL dKYYGYGGGN TY DTK LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSpf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSpf CDLF. TAEE YvsYEYYydL dKYYGtGPGN dD. Aht LSPF CDLF. TATE WtQYNYLISL dKYYGYGGGN dD. Aht LSPF CDLF. TAAE WtQYNYLISL dKYYGYGGGN TV. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN TV. DTK LSPF CDLF. ThDE WHYDYLRSL KKYYGHGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSpf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSpf CDLF. TAEE YvsYEYYydL dKYYGtGPGN dD. Aht LSPF CDLF. TATE WtQYNYLISL dKYYGYGGGN dD. Aht LSPF CDLF. TAAE WtQYNYLISL dKYYGYGGGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN TV. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSpf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSpf CDLF. TAEE YvsYEYYydL dKYYGtGPGN dD. Aht LSPF CDLF. TATE WtQYNYLISL dKYYGYGGGN dD. Aht LSPF CDLF. TADE WTYNYLISL dKYYGYGGGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLRSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSpf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ gnaSpf CDLF. TAEE YvsYEYYydL dKYYGtGPGN dD. Aht LSPF CDLF. TATE WtQYNYLISL dKYYGYGGGN dD. Aht LSPF CDLF. TAAE WtQYNYLISL dKYYGYGGGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLRSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLRSL KKYYGHGAGN Tv. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN SD. ASQ. LSPF CQLF. ThNE WKKYNYLQSL GKYYGYGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC32722	ekkSdf CtlFegiPGs FeaFAYggdL dKFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dKFYGtGyGQ errSef CDIYeelqAE daFAYnadL dKFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dKFYGtGyGQ kKYYGTGGN dKYYGYGGGN dKYYGYGGGN dKYYGYGGGN WHYDYLISL dKYYGYGGGN WKYYGYGGGN WKYYGHGAGN TV. DTK. LSPF CDLF. ThDE WHYDYLRSL KKYYGHGAGN TV. DTK. LSPF CDLF. ThDE WHYDYLQSL KKYYGHGAGN SD. ASQ. LSPF CQLF. ThNE WKKYNYLQSL GKYYGYGAGN SD. ASQ. LSPF CQLF. ThNE WKKYNYLQSL GKYYGYGAGN
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC32722 A. fumigatus ATCC58128	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFGdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dKFYGTGYGA dKFYGTGYGQ dFFTFTGF dKFYGTGYGG dKFYGTGYGQ dKFYGTGYG
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC32722 A. fumigatus ATCC58128 A. fumigatus ATCC58128	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFGdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dKFYGTGYGA dKFYGTGYGQ dKFYGTGYGQ dKFYGTGYGQ dKFYGTGYGQ dKFYGTGYGA dKFYGTGYGQ dKFYGTGYGA dKFYGTGYGQ dKFYGTGYGA dKFYGTGYGQ dKFYGTGYGA dKFYGTGYGQ dKFYGTGYGA dKFYGTG
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC32722 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC26908	ekkSdf CtlFeqiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFeqiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dkFYGTGGQ dkFYGTGGO dkFYGGGO dKFYGTGGO dKFYGTG
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9al A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC232722 A. fumigatus ATCC26906 A. fumigatus ATCC32239 E. nidulans	ekkSdf CtlFeqiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFeqiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dkFYGtGyGQ dkFYGGGG dkFYGtGyGQ dkFYGTGGG dkFYGtGyGQ dkFYGTGGG dkFYGtGyGQ dkFYGTGGG dkFYGtGyGQ dkFYGTGGG dkFYGtGyGQ dkFYGTGGG dkFYGGGG dkFYGTGGG dkFYGGGG dkFYGGGG dkFYGG
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC32238 E. nidulans T. thermophilus	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dkFYGGG dF
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC32238 E. nidulans T. thermophilus T. lanuginosus	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dkFYGGG dF
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC32238 E. nidulans T. thermophilus	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFGdL dkFYGtGyGQ dkFYGtGyGG dkFYGtGyGG dkFYGtGyGG dkFYGtGyGG dkFYGtGyGA dkFYGtGyGG dkFYGTGGG dkFTGF dkFTG
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC32238 E. nidulans T. thermophilus T. lanuginosus	ekkSdf CtlFegiPGs FeaFAYggdL dkFYGtGyGQ eqkSdf CtlFegiPGs FeaFAYagdL dkFYGtGyGQ errSef CDIYeelqAE daFAYnadL dkFYGtGyGQ etpSPf CNLF. TPEE FaQFEYFgdL dkFYGtGyGQ dkFYGTGGQ dkFYGtGyGQ dkFYGGG dF

APPROVED O.G. FIG. CLASS SUBCLASS ΒY DRAFTSHAN

	350
	301 eLGPvQGVGY vNELIARLTN S.AVRDNTQT NRTLDASPVT FPLNkTFYAD
P. involutus (phyA1)	ALGPVQGVGY INELLARLIN S.AVNDNTQT NRTLDAAPDT FPLNKTMYAD
P. involutus (phyA2)	PLGPVQGVGY INELLARLIN S.AVNDNTQT NSTLDSSPET FPLNrTLYAD PLGPVQGVGY INELIARLTA q.nVsDHTQT NSTLDSSPET FPLNrTLYAD
T. pubescens	PLGPVQGVGY INELIARLIE M.PVRDNTQT NRTLDSSPIT FPLDTSIYAD PLGPVQGVGY INELLARLTE M.PVRDNTQT NRTLDSSPIT FPLDTSIYAD
A. pediades	PLGPVQGVGY INELLARLTE M.PVRDMTQT NRTLDSDPAT FPLNTTFYAD ALGPVQGVGY VNELLARLTG Q.AVRDETQT NRTLDSDPAT FPLNTTFYAD
P. lycii	ALGPVQGVGY VNELLARLTG Q.AVRDETQT NRTHDSDTM TFPLNATLYAD PLGPVQGVGW ANELMARLTR A.PVHDHTCV NNTLDASPAT FPLNATLYAD
A. terreus 9al	PLGPVQGVGW aNELMARLTR A.PVHDHTCV NNTHDASTMT TELMATLYAD
A. terreus cbs	PLGPVQGVGW ANELIARLTR S. PVHDHTCV NNTLDANPAT FPLNATLYAD PLGPVQGVGW ANELIARLTR S. PVHDHTCV NNTLDANPAT FPLNATLYAD
A. niger var. awamori	PLGPTQGVGY ANELIARLTH S.PVHDDTSS NHTLDSNPAT FPLNSTLYAD
A. niger T213	PLGPTQGVGY ANELIARLTH S.PVHDDTSS NHTLDSNPAT FPLNSTLYAD
A. niger NRRL3135	PLGPTQGVGY ANELIARLTH S.PVHDDTSS NHTLDSSPAT FPLNSTLYAD
A. fumigatus ATCC13073	PLGPAQGIGF tHELIARLTR S.PVQDHTST NSTLVSNPAT FPLNATMYVD
A. fumigatus ATCC32722	PLGPAQGIGF tNELIARLTR S.PVQDHTST NSTLVSNPAT FPLNATMYVD
A. fumigatus ATCC58128	PLGPAQGIGF tNELIARLTR S.PVQDHTST NSTLVSNPAT FPLNATMYVD
A. fumigatus ATCC26906	PLGPAQGIGF tNELIARLTR S.PVQDHTST NSTLVSNPAT FPLNATMYVD
A. fumigatus ATCC32239	PLGPAQGIGF tNELIARLTN S.PVQDHTST NSTLDSDPAT FPLNATIYVD
E. nidulans	PLGPAQGIGF tNELIARLTQ S.PVQDNTST NHTLDSNPAT FPLDrkLYAD
T. thermophilus	PLGPAQGVGF VNELIARMTH S.PVQDYTTV NHTLDSNPAT FPLNATLYAD
T. lanuqinosus	AFGPSRGVGF VNELIARMTG N1PVKDHTTV NHTLDdNPET FPLDAVLYAD
M. thermophila	PLGPTQGVGF VNELLARLA. GVPVRDGTST NRTLDGDPrT FPLGrPLYAD
	THE PART OF THE PA
Consensus Seq. 11	PLGPAQGVGF -NELIARLTH S-PVQDHTST NHTLDSNPAT FPLNATLYAD
-	400
	251
P. involutus (phyA1)	FSHDNIMVAV FSAMGLFrqP aPLSTSVpNP wrtWr TSSlVPFSGR
P. involutus (phyA2)	FSHDNIMVAV FSAMGLFTQT GPLSTSTDDP nrtWl TSSVVPFSAR FSHDNIMVAV FSAMGLFTQS aPLSTSTDDP nrtWl TSSVVPFSAR
T. pubescens	FSHDNIMVAV FSAMGLFIQS aPLdPTTpDP artFl vkkiVPFSAR FSHDNQMVAI FSAMGLFIQS aPLdPTTpDP artFl vkkiVPFSAR
A. pediades	LSHDNQMIAI FSAMGLFNQS SPLdPSfpNP krtWv TSRltpFSAR
P. lycii	FSHDNTMVPI FAALGLFNAT a.LdPlkpDe nrlWv DSklVPFSGH
A. terreus 9al	FSHDSnLVSI FWALGLYNGT APLSQTSVES VS. QTDGYA AAWTVPFAAR
A. terreus cbs	FSHDShLVSI FWALGLYNGT KPLSQTTVEd ItrTDGYA AAWTVPFAAR FSHDShLVSI FWALGLYNGT KPLSQTTVED ItrTDGYS SAWTVPFASR
A. niger var. awamori	FSHDSHLVSI FWALGLYNGT KPLSTTTVEN It. QTDGFS SAWTVPFASR
A. niger T213	FSHDNGIISI LFALGLYNGT KPLSTTTVEN It. QTDGFS SAWTVPFASR
A. niger NRRL3135	FSHDNGIISI LFALGLYNGT KPLSTTTVEN ItQTDGFS SAWTVPFASR FSHDNGIISI LFALGLYNGT KPLSTTTVEN ItQTDGFS SAWTVPFGAR
A. fumigatus ATCC13073	FSHDNSHVSI FFALGLYNGT EPLSTTSVES ak. ElDGYS ASWVVPFGAR
A. fumigatus ATCC32722	FSHDNSMVSI FFALGLYNGT GPLSrTSVES ak. ElDGYS ASWVVPFGAR FSHDNSMVSI FFALGLYNGT GPLSTTSVES ak. ElDGYS ASWVVPFGAR
A. fumigatus ATCC58128	FSHDNSMVSI FFALGLYNGT EPLSrTSVES ak. ElDGYS ASWVVPFGAR FSHDNSMVSI FFALGLYNGT EPLSrTSVES ak. ElDGYS ASWVVPFGAR
A. fumigatus ATCC26906	FSHDNSMVSI FFALGLYNGT EPLSrTSVES ak. ElDGYS ASWVVPFGAR FSHDNSMVSI FFALGLYNGT EPLSrTSVES ak. ELDGYS ASWAVPFGAR
A. fumigatus ATCC32239	FSHDNSMVSI FFANGLYNGT EPLSQTSeES tk. ESNGYS ASWAVPFGAR FSHDNGMIPI FFANGLYNGT EPLSQTSeES tk. ESNGYS ASWAVPFGAR
E. nidulans	
T. thermophilus	FSHDNSMISI FFAMGUINGT akLSTTEIKS IE. ETDGYS AAWTVPFGGR FSHDNTMtSI FAALGLYNGT akLSTTEIKS IE. ETDGYS AAWTVPFGGR
T. lanuginosus	FSHDNIMUSI FAALIGHINGI KPLSTSKIQP PUGAAADGYA ASWIYPFAAR FSHDNIMUSI FSAMGLYNGI KPLSTSKIQP PUGAAADGYA ASWIYPFAAR
M. thermophila	FSHDNIMLGI FSAMBIRGI KILDER FSHDNIMMGV LGALGAYDGV PPLdkTArrdpeElGGYA ASWAVPFAAR
-	
Consensus Seq. 11	FSHDNTMVSI FFALGLYNGT KPLSTTSVES IETDGYA ASWTVPFAAR

	and the latest designation of the latest designation of		
PPROVED	0.G. F	IG.	
ΘY	CLASS	SUBCLASS	
RAFTSHAN			

	450
P. involutus (phyA1)	wvVErLsC. fGt Tk VRVLVQDQVq PLEfCGgDRn
P. involutus (phyA2)	
T. pubescens	
A. pediades	
P. lycii	
A. terreus 9al	
A. terreus cbs	
A. niger var. awamori	
A. Higer var. awamer	
A. niger T213 A. niger NRRL3135	
A. fumigatus ATCC13073	TV HOLL VRAILINDING THE COLUMN
A. fumigatus ATCC32722	
A. rumigatus Arcc32/22	
A. fumigatus ATCC58128	EK FPL VRAHINDRVV 1 1110 - 1
A. fumigatus ATCC26906 A. fumigatus ATCC32239	EK EDI VRAHINDAVV I BIOGITI
	VV EDI VRVLVNDRVV FILIGGIAZZI
E. nidulans	an Eby Akanaka I misconina
T. thermophilus	
T. lanuginosus	AYVELLRCET ETSSELEELGEDET VRVLVNDRVM TLKGCGaDEr
M. thermophila	
Consensus Seq. 11	AYVEMMQCEA GG-G-GG-EGEKEPL VRVLVNDRVV PLHGCGVDKL
Cousenage pod	
	482
	451 482
P. involutus (phyA1)	451 CLCHAREVE SOTFARSDOM GDFEKCFAts a~
P. involutus (phyA1) P. involutus (phyA2)	451 GlCtLAKFVE SqTFARSDga GDFEKCFAts a~ GlCaLDKFVE SqAYARSGga GDFEKCLAtt v~
P. involutus (phyA2)	451 GlCtLAKFVE SqTFARSDga GDFEKCFAts a~ GlCaLDKFVE SqAYARSGga GDFEKCLAtt v~ GVCtLDAFVE SQAYARNDge GDFEKCFAt~ ~~
P. involutus (phyA2) T. pubescens	GlCtLAKFVE SqTFARSDga GDFEKCFAts a~ GlCaLDKFVE SqAYARSGga GDFEKCLAtt v~ GvCtLDAFVE SqAYARNDge GDFEKCFAt~ ~~ SlCtLEAFVE SgkYAReDgq GDFEKCFD~~ ~~
P. involutus (phyA2) T. pubescens A. pediades	GlCtLAKFVE SqTFARSDga GDFEKCFAts a- GlCaLDKFVE SqAYARSGga GDFEKCLAtt v- GvCtLDAFVE SqAYARNDge GDFEKCFAt SlCtLEAFVE SqKYAReDgq GDFEKCFD GVCFLEAFVE SqTYAReNqq GDFAKCgfvp se
P. involutus (phyA2) T. pubescens A. pediades P. lycii	GlCtLAKFVE SqTFARSDga GDFEKCFAts a~ GlCaLDKFVE SqAYARSGga GDFEKCLAtt v~ GvCtLDAFVE SqAYARNDge GDFEKCFAt~ ~~ SlCtLEAFVE SqKYAREDgq GDFEKCFD~~ ~~ GvCELsAFVE SqTYARENgq GDFAKCgfvp se GDCKrDAFVA GLSFAQAG GNWADCF~~~
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs	GlCtLAKFVE SqTFARSDga GDFEKCFAts a- GlCaLDKFVE SqAYARSGga GDFEKCLAtt v- GvCtLDAFVE SqAYARNDge GDFEKCFAt SlCtLEAFVE SqKYAREDgq GDFEKCFD GvCELSAFVE SqTYARENgq GDFAKCgfvp se GRCKrDAFVA GLSFAQAG GNWADCF GRCKrDDFVE GLSFARAG GNWAECF
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs	GlCtLAKFVE SqTFARSDga GDFEKCFAts a- GlCaLDKFVE SqAYARSGga GDFEKCLAtt v- GvCtLDAFVE SqAYARNDge GDFEKCFAt- ~- SlCtLEAFVE SqKYAREDgq GDFEKCFD ~- GvCELSAFVE SqTYARENgq GDFAKCgfvp se GRCKrDAFVA GLSFAQAG GNWADCF ~- GRCKrDDFVE GLSFARAG GNWAECF ~- GRCKrDSFVr GLSFARSG GDWAECSA ~-
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori	GlCtLAKFVE SqTFARSDga GDFEKCFAts a- GlCaLDKFVE SqAYARSGga GDFEKCLAtt v- GvCtLDAFVE SqAYARNDge GDFEKCFAt- SlCtLEAFVE SqKYAREDgq GDFEKCFD GvCELSAFVE SqTYARENGQ GDFAKCGfvp se GRCKrDAFVA GLSFAQAG GNWADCF GRCKrDDFVE GLSFARAG GNWAECF GRCtrDsFVr GLSFARSG GDWAECSA GRCtrDsFVr GLSFARSG GDWAECFA
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135	GlCtLAKFVE SqTFARSDga GDFEKCFAts a- GlCaLDKFVE SqAYARSGga GDFEKCLAtt v- GvCtLDAFVE SqAYARNDge GDFEKCFAt- SlCtLEAFVE SqKYAREDgq GDFEKCFA- GvCELSAFVE SqTYARENGQ GDFAKCGfvp se GRCKrDAFVA GLSFAQAG. GNWADCF GRCKrDDFVE GLSFARSG. GNWAECF GRCtrDsFVr GLSFARSG. GDWAECFA GRCtrDsFVr GLSFARSG. GDWAECFA GRCtrDsFVr GLSFARSG. GDWAECFA GRCtrDsFVr GLSFARSG. GDWAECFA
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073	GRCKIDBFVE GLSFARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSWARSG. GRCKLNDFVK GLSFARSG. GRCKLNDFVK GLSFARSG. GRCKLNDFVK GLSFARSG. GRCKLNDFVK GLSFARSG. GRCKLNDFVK GLSWARSG. GRCKLNCFCKS.
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC32722	GCtlakfve SqTfARSDga GDFEKCFAts a- GlCalDkfve SqAyARSGga GDFEKCLAtt v- GvCtlDafve SqAyARNDge GDFEKCFAt- SlCtLEAFVE SqkyAReDgq GDFEKCFD GvCelsafve SqtyAReNgq GDFAKCgfvp se GRCkrDafva GLSFAQAG. GNWADCF GRCkrDDfve GLSFARSG. GNWAECF GRCtrDsfvr GLSFARSG. GDWAECFA GRCtrDsfvr GLSFARSG. GDWAECFA GRCtrDsfvr GLSFARSG. GDWAECFA GRCklNDfvk GLSWARSG. GNWGECFS
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat- slctleafve sqkyaredgq gdfekcfat- Gvcelsafve sqtyarengq gdfakcgfvp se grckrdafva glsfaqag. gnwadcf Grckrdbfve glsfarsg. gnwaecf Grctrdsfvr glsfarsg. gdwaecfa Grctrdsfvr glsfarsg. gdwaecfa Grctrdsfvr glsfarsg. gdwaecfa Grctrdsfvr glsfarsg. gdwaecfa Grcklndfvk glswarsg. gnwgecfs Grcklndfvk glswarsg. gnwgecfs Grcklndfvk glswarsg. gnwgecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC58128	GlCtLakfve SqTfARSDga GDFEKCFAts a- GlCalDkfve SqAyARSGga GDFEKCLAtt v- GvCtLDAFVE SqAyARNDge GDFEKCFAt- SlCtLEAFVE SqkyAReDgq GDFEKCFAt- GvCelsafve SqtyAReNgq GDFEKCFD GRCKrDAFVA GLSFAQAG. GNWADCF GRCkrDDFVE GLSFARSG. GNWAECF GRCtrDsFvr GLSFARSG. GDWAECFA GRCtrDsFvr GLSFARSG. GDWAECFA GRCtrDsFvr GLSFARSG. GDWAECFA GRCklnDfvk GLSWARSG. GNWGECFS
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC58128	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat slctleafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrdbfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecsa grctrdsfvr glsfarsg. gdwaecfa grcklndfvk glswarsg. gnwgecfs grcklndfvk glswarsg. gnwgecfs grcklndfvk glswarsg. gnwgecfs grcklkdfvk glswarsg. gnwgecfs grcklkdfvk glswarsg. gnwgecfs grcklkdfvk glswarsg. gnwgecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrddfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecsa grctrdsfvr glsfarsg. gdwaecfa grckrddfvk glsfarsg. gdwaecfa grctrdsfvr glsfarsg. gdwaecfa grcklndfvk glswarsg. gnwgecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC26908 A. fumigatus ATCC32239 E. nidulans	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrdbfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecfa grctrdsfvr glsfarsg. gdwaecfa grckrdbfvk glswarsg. gnwaecfs grcklndfvk glswarsg. gnwaecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC32239 E. nidulans T. thermophilus	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat slctleafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrddfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecfa grctrdsfvr glsfarsg. gdwaecfa grcklndfvk glswarsg. gnwgecfs grcklddfvk glswarsg. gnwgecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC32239 E. nidulans T. thermophilus T. lanuginosus	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrdbfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecfa grctrdsfvr glsfarsg. gdwaecfa grckrdbfvk glswarsg. gnwaecfs grcklndfvk glswarsg. gnwaecfs
P. involutus (phyA2) T. pubescens A. pediades P. lycii A. terreus 9a1 A. terreus cbs A. niger var. awamori A. niger T213 A. niger NRRL3135 A. fumigatus ATCC13073 A. fumigatus ATCC58128 A. fumigatus ATCC58128 A. fumigatus ATCC32239 E. nidulans T. thermophilus	Glctlakfve sqtfarsdga gdfekcfats a- glcaldkfve sqayarsgga gdfekclatt v- gvctldafve sqayarndge gdfekcfat slctleafve sqayarndge gdfekcfat gvcelsafve sqtyaredgq gdfekcfd grckrdafva glsfaqag. gnwadcf grckrddfve glsfarag. gnwaecf grctrdsfvr glsfarsg. gdwaecfa grctrdsfvr glsfarsg. gdwaecfa grcklndfvk glswarsg. gnwgecfs grcklddfvk glswarsg. gnwgecfs

APPROVED O.G. FIG.
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				_				.	T	c	т	A	ידי	τ.	F	G	s	т	s	G	т	20
7			CGT	GTI	'CG'	TC	3TG 	-+-	CTC	TCC	CTAT	GCC	ACC	TTC	TTC	:GG1	TCC	CAC			TACC	60
1	TAC	CCC	GCA	.CA/	AGC.	AG	CAC	GAT	GAC	AGG	TAZ	ACGG	TGG	AAC	CAAC	3CCI	AAGO	3TG	ľAG	3CC/	ATGG	
	A GC	L CTT	G GGG	ידירי	TC	GT	GGI	N LAA	TCT	H CCAC	CTC	C TG1	CGAC	CAC	rgT)	rga(CGG7	rgg'	TTA(CCA	ATGT	40 120
61	CGG	 3AA	CCC	AGC	GAG	CA	CCA	- + - \TTA	AGI	GTO	GAG	AACI	ACTO	GTG2	ACAZ	ACT	GCC!	ACC.	AAT	GGT'	raca	120
	F	P	E AGA	יממ	гтт	CT	CAC	TTC	FTG(GG.	rac(Y CTA(CTCT	rcc/	ATA(CTT	CTC.	rt T	GGC	D AGA	E CGAA	60
121				+ -				-+-	·	- - -	- -	+			-+			+			+ GCTT	180
	s	A	I	s	P		D	V	P	D	D	C	R	V AGT!	T TAC'			~	V AGT'		S GTCT	80
187				+				+-		- - -		+	·	- - -	-+-			+			+ CAGA	240
	P	н	G	Α	R	2	Y	P	т	s	s	A	s	ĸ	A	Y	s	A	L	I	E	100
241				+		. – –		+	- - -		-	+		- - -	-+-			+			TGAA + ACTT	300
	Δ	т	0	к	N	ī	A	т	Α	F	K	G	ĸ	Y	A	F	L	ĸ	т	Y	N	120
301	- -		. -	+		-		+		- - -		+		-	-+-			+			CAAC	360
							CG D	ATG:	ACG L		GTT P			E	N	дда О	.gaa M	V		S	GTTG G	140
361				TGG	GTC	3CT	GA	CGA	CTT	GAC	TCC	ATT +	CGG	TGA	AAA -+-	.CCA		+			TGGT	420
301	ΓA	GTO	AAE	ACC	CAC	CGA	ACT	GCT	GAA	CTG	AGG	TAA	.GCC	ACT	TTT	GGT	TTA	CCP	TTA	GAG	SACCA	7.50
	I PA	K TA	F AGT	TCT	'AC	R AG <i>P</i>	R AAG	Y ATA	CAA	GGC	TTT	GGC	TAG	K AAA	GAT	TGT	P TCC	'ATI	CAT	R TAC	A BAGCT	160 480
421	TA	AT'	rca.	+ AGA	TG	rc7	rtc	TAT	 GTT	CCG	AAA	'CCC	ATC	TTT:	CTA	ACA	AGG	TAZ	AGTA	ATO	CTCGA	
	тα	ግጥርፈር	ገ ጥጥ	СТС	AC	AGZ	AGT	TAT	TGC	TTC	TGC	E CTGA	AAA	GTI	CAT	TG	AGG	TT:	rcc <i>i</i>	TA	CTGCT	180
481	AC	 BAC	 CAA	1 GAO	 'TG'	TC	rca	+ ATA	ACC	 BAAG	BACC	+	TTT	CAA	GTA	ACT	rtco	CAA	AGGT	TAC	+ BACGA	540
	K A 7	L AGT	A TGG	. I) :	P CC	G AGG	S TTC	Q TC#	P ACC	H CAC	Q ACC <i>I</i>	A AAGO	S	P	V CAG	I TAT	<u>N</u> AT1	V ACG:	I 'GA'	I CATT	200
541	١			4				+			-	-+			+-	-			+		+ AGTAA	600
	P	E	G	; ;	5	G G	Y	N	N	T	L	D raci	H	G Acc	T TTA	C VTPTV	T ነልጥድ	A TTC:	F Cururi	E TCG	D AAGAC	220
603	1 -			. .	+ - -		- 	- - -	- - -		- .	-+-			+-	-			+		+ TTCTG	660

Fig. 7a

APPROVED O.G. FIG.

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	TCT	GAA	TT	AGG:	rga(CGA	CGT'	TGA	AGC'	TAA	CTT	CAC'		TTT	GTT	CGC	TCC	AGC'	rat:	ΓAGA	240 720
661																				ATCT	720
721		AGA	TTC	GA/	\GC'	TGA(CTT	GCC.	AGG'	TGT'	TAC'	TTT		TGA(CGA.	AGA	CGT'		TTA	L CTTG	260 780
	CGA	TCI	'AAC	CCT	rcg/	ACT	GAA(CGG'	TCC.	ACA	ATG	AAA		ACT	GCT	TCT	GCA.	ACA	AAT(JAAC	280
781		GAC	ATC	3TG:	rcci	ATT	CGA(CAC' 	TGT 	CGC'	TAG: +	AAC' 	TTC'	TGA(CGC'	TAC	TGA. +	ATT(GTC:	rcca +	840
																				AGGT G	300
841	TTC	TGI	GC.	rtt	3TT	CAC'	TCA	CGA	CGA	ATG	GAT	CCA	ATA	CGA	CTA	CTT	GCA	AAG	CTT	GGT +	900
																				CCCA	220
901		TAC	TAC	CGG:	TTA(CGG'	TGC' +	TGG' 	TAA 	CCC.	ATT(+	GGG'	TCC	AGC' -+-	TCA.	AGG 	TGT +	TGG' 	TTT(CGCT	320 960
	TTC N		EAT(GCGA H	340
961	AAC	GAA	TTC	TAE	rgc'	TAG	ATT(+	GAC	TCA	CTC	TCC. +	AGT 	TCA	AGA(-+-	CCA 	CAC	TTC' +	TAC' 	TAA(CCAC	
	TTG T												AGT' A						ATT(GGTG S	360
1021	ACT	TTC	GA(CTC'	raa 	CCC	AGC' +	TAC	TTT 	CCC.	ATT +	GAA 	CGC' 	TAC' -+-	TTT	GTA 	CGC +	TGA	CTT(CTCT	
	TGA H																			GAGA P	380
1081	CAC	GAC	CAA	CAC'	FAT (GAT.	ATC' +	TAT 	TTT 	CTT 	CGC +	TTT 	GGG' 	TTT(-+-	GTA 	CAA 	CGG +	TAC	CAA(GCCA	
																				CGGT T	400
1141	TTG	TCT	CAC	TAC'	ГТС' 	TGT 	TGA +	ATC 	TAT 	TGA 	AGA +	AAC	TGA	CGG'	TTA 	CTC	TGC +	TTC' 	TTG(GACT	
																				CTGA P	420
1201	GTT	'CCI	TT	CGC'	TGC'	TAG	AGC	TTA	CGT	TGA	AAT	GAT	GCA	ATG	TCA	AGC	TGA	AAA	GGA.	acca	
																				rggt K	440
	TTG	GTT	ragi	AGŤ' -+-	TTT 	GGT 	TAA +	.CGA	CAG	AGT	TGT +	TCC	ATT 	GCA -+-	CGG 	TTG 	TGC +	TGT 	TGA:	CAAG +	1320
	770	(A)	ישי	י מיטיד	777	CCN	ע שייי	COT	CTC	ידירי א	$\nabla \nabla \nabla$	ACC	ת א די	CCT	$\alpha c c$	አአሮ	ACC	$\Delta C \Delta$	አ ርጥ	CTTC	

Fig. 7b

	т.	G	R	С	к	R	D	D	F	v	E	G	L	s	F	A	R	s	G	G	460
1321	тт.	מממ	тда	ΔͲርΨ	ТАА	GAG	AGA	CGA	CTT	CGT'	TGA	AGG	TTT(GTC'	$_{ m TTT}$	CGC	TAG.	ATC'	TGG	TGGT	1380
1321	AA	CCC	ATC	TAC	TTA	CTC	TCT	GCT	GAA	GCA.	ACT	TCC	AAA	CAG.	AAA	GCG	ATC	TAG	ACC	ACCA	
							A CGC			467											

1381 ------ 1410 TTGACCCGACTTACAAAGCGAATT

ng 4555.cles

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PY	CLASS	SUBCLASS
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																			G CGG	T FACC	20
1				-+			+				+			-+			+			ATGG	60
	GCC	TTC	GGT	rcc:	rcg:	TGG	TAA	CTC'	rca(CTC	rtgʻ	TGA(CAC	rgt:	rga(CGG	TGG'	TTA		ATGT	40
61																				+ TACA	120
	TTC	CCZ	\GA/	AAT'	rtc:	TCA	CTT	GTG(GGG'	TAC	ATA	CTC:	rcc2		CTT	CTC'	TTT	GGC'	TGA	E CGAA	60
121																				+ GCTT	180
	TCT	GC7		rTC:	rcc	AGA	CGT'	TCC.	AAA	GGG'	rtg'	TAG	AGT:	rac:	rtt(CGT	TCA	AGT		GTCT	80
181																				CAGA	240
	AGA	CAC	CGG:	rgc'	rag.	ATA	CCC	AAC'	TTC'	rtc'	r <u>G</u> C	GTC'	TAAG		GTA(CTC'	TGC	TTT	GAT'	E IGAA	100
241																				ACTT	300
		'AT	rca <i>i</i>	AAA	GAA	CGC'	TAC'	TGC'	rtt.	CAA	GGG'	TAA	GTA(CGC:	TTT(CTT	GAA	GAC		CAAC	120
301																				+ GTTG	360
		CAC		GG'		TGA		CTT		TCC	TTA		TGA/	ACAZ	ACA	TAA	GGT		CTC'	G TGGT	140
361																				+ ACCA	420
	ATT	CAA(3TTC	CTA	CAG	AAG.	ATA	CAA	GGC	TTT	GGC'	TAG	AAA		TGT'	TCC	ATT	CAT	TAG	AGCT	160
421																				+ TCGA	480
	TCT	rgg:	rtc:	rga(CAG	AGT	TAT	TGC	TTC	TGC'	TGA.	AAA	GTT(CAT'	TGA.	AGG	TTT	CCA		TGCT	180
481																				acga	540
	AA	3TTC	GC'	rga(CCC	AGG	TGC	TAA	CCC	ACA	CCA	AGC'	TTC'		AGT'	TAT	TAA	CGT	TAT	I TATT +	200
541	TTC	CAAC	CCG	ACT	GGG'	TCC	ACG.	ATT	GGG	TGT	GGT'	TCG.	AAG	AGG'	TCA.	АТА	ATT	GCA	ATA	ATAA	600
<i>c</i> c c c c c c c c c c c c c c c c c c	CC	AGA/	AGG	rgc'	TGG'	TTA	CAA	CAA	CAC	TTT	GGA	CCA	CGG'	TTT	GTG	TAC	TGC	TTT		E AGAA +	220 660
POT																				יייייטייי 	300

Fig. 8a

APPROVED O.G. FIG.
BY CLASS SUBCLASS
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	-	E CTGA		_		D ACGA														R TAGA	240
661																				ATCT	
	GC			'GGA		TCA	CTI	'GCC	AGG		'TAA	CTI		TGA	CGA		ACGI		TAA	L CTTG	
721																				GAAC	
501	ΑT			'GTG	TCC		'CGA	CAC	TGT	TGC	TAC	AAC	TTC	TGA	CGC	TAC	CTC	LTA	GTC	TCCA	
781																				AGGT	
841	TT		TGA	.CTT	GTT		TCA	.CGA	.CGA		GAT	'TCA	ATA	CGA	.CTA	CTI	rgc <i>z</i>	ATC	TTT:	G GGGT	
041																				.CCCA	
901	AA		CTA	.CGG	TTA	.CGG	TGC		TAA	ccc	ATT	'GGG	TCC	AGC	TCA	AGG	TGT		TTT	V CGTT	
																				GCAA	
961		.CGA			TGC		ATT	GAC	TCA		TCC	AGT	TCA	AGA	CCA	CAC				H .CCAC	340 1020
																				GGTG	1020
1021			GGA	CTC		CCC	AGC	TAC	TTT		ATT	GAA	CGC		TTT	GTA	CGC			S CTCT	360 1080
	TG	AAA	CCT	GAG.	ATT	GGG	TCG.	ATG	AAA	GGG	TAA	CTT	GCG	ATG.	AAA	CAT.	GCG	ACT	GAA	GAGA	1000
1081	CA			CAC	TAT		TTC	TAT	TTT	CTT	CGC	TTT	GGG	TTT	GTA	CAA	CGG	TAC	TAA	GCCA	380
	GT	GCT	GTT	GTG.	ATA	CCA	AAG.	ATA.	AAA	GAA	GCG	AAA	CCC	AAA	CAT	GTT	'GCC	ATG	ATT	CGGT	
1141		GTC	TAC'	TAC'	TTC	TGT'	TGA	ATC'	TAT	TGA	AGA	AAC	TGA	CGG'	TTA	CTC	TGC	TTC	TTG	T GACT	400 1200
	AA	CAG	ATG.	ATG	AAG.	ACA	ACT'	TAG	ATA.	ACT'	TCT	TTG.	ACT	GCC.	AAT	GAG	ACG	AAG	AAC	CTGA	
1201	GT	TCC	ATT	CGC'	TGC	TAG	AGC'	TTA	CGT'	TGA.	AAT	GAT	GCA	ATG'	TGA	AGC	TGA	AAA	GGA	P ACCA	420 1260
																				TGGT	
1261	TT	GGT'	TAG	AGT'	TTT	GGT'	TAA	CGA	CAG	AGT'	TGT'	TCC.	ATT	GCA	CGG	TTG	TGG	TGT	TGA	CAAG	440 1320
																				GTTC	

	т.	G	R	C	ĸ	R	D	D	F V	E	G	L	s	F	A	R	s	G	G	460
	тт.	aaa	ጥልሮ	ΔТС	тΔΔ	GAG	AGA	CGAC	TTCGT	TGA	AGG	TTT	GTC	TTT	CGC	TAG	ATC	TGG	TGGT +	1380
1321	a-	 CCC	 ATC	-+- TAC	- - - ATT	CTC	TCT	GCTG	AAGCA	ACT	TCC	'AAA	.CAG	AAA	GCG	ATC	TAG	ACC	ACCA	
	N	W	~	E	C	Ŧ	Α	*	467	,										
	AA	CTG	GGA	AGA	ATG	TTT	'CGC	TTAA												
1381		-		-+-		- - -	+		1404	Ŀ										
	TT	GAC	CCT	TCT	TAC	AAA	GCG	TTAA	ı											

APPROVEO	0.G. F	FIG.
BY	CLASS	SUBCLASS
DRAFTSMAN		

ATGGGGTTTTCGTCGTTCTATTATCTATCGGAGTCTGTTCGGCAGCACATCGGCACT TACCCCCAAAAGCAGCAAGATAATAGATAGCGCTGAGACCAGCGTCGTGAGCCCGTGA A L G P R G N H S K S C D T V D L G Y Q 40 GGGCTGGGCCCCGGTGGAAAACCACCCCAAGTCCTCGGATACGTTACGCTAGGCTACCAG CCGCACCCGGGGGCACCTTTAGTGAGGTTCAGGACGCTATGCCATTGCTCCATGGTC C S P A T S H L W G T Y S P Y F S L E D 60 TGCTCCCCTGCGATAGGTTATTTCGCTGAGGACGCATGTTTTCGCTCGAGGAC E L S V S S K L P K D C R I T L V Q V L 80 GAGCTGTCCCTGTCTATCTAGAGGATTCCCAAGGATCACCTTGGAACCACTAG S R H G A R Y P T S S K S K Y K K L I 100 TCGCGCACTGGAGCACCTACTCTCAACGGTTCCCAAGGATCACCTTGTAACAGGTTAT S R H G A R Y P T S S K S K Y K K L I 100 TCGCGCCATGGAGCCCCAACCAACCACCTCCAAGAGCAAAAAAGTATAAGAAGCTTATT AGCGCGGTACCTCGCCCAACCAACCACCTCCAAGAGCAAAAAAGTATAAGAAGCTTATT T A I Q A N A T D F K G K Y A F L K T Y 120 AACGACGGATCCAGGCCCAATGGTTCCCAAGGGCTACCTTTTTCATATTCTTCGAACAG N Y T L G A D D L T P F G E Q Q L V N S 140 AACTATACTCTGGGTGCTACCTAACGTCCCAACTCCCTTTTGGAGAACAACTTTTGAACGTTGCATGAT TTGATATGAGAACCCACGCCTACTGGATGAGGCAAGAACAAAAACTTTTGAACAGGTTC G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCCAAGGTCCAACCAGCTCCAACCACCCCCCTTTTTGGGGAACCACCTTTATTCGC C G K F Y Q R Y K A L A R S V V P F I R 160 GGCATCCAAGGTTCCAAGGATCACAGGCCTTACTGGAGGAAAAACTTCTTATACCCCTTTATTCCC C GGAGTCCAGGCTACTCACAGGACTACCCAACCACCTCCCTTTTGGGGAACACCCCTCTTATTCGC A S G S D R V I A S G E K F I E G F Q Q 1 GCCAAGCTTCACGAGGACAAAAACCTCCCCTTCTTCAAGGACCACCACCTTATTCCC A S G D R Y I A S G E K F I E G F Q Q 1 GCCAAGCTCCAGGCCTACTCACAGGACCACCCCCCGCCTTCATCCAGGGTTCCACCCAC		ΔТС	GGG	GTT	TTT	CGTC	GT.	rct <i>i</i>	ATT	S ATCI	CATO	CGCC	AC.	CTC	3TTC	CGG	CAG	CAC	ATC	G GGG	CACT	20
GCGCTGGGCCCCGTGGAAATCACTCCAAGTCCTGGATACACTAGGGTACCAG 61	1		- - -		-+		- -	+-		- -	4			- -	- +			+			+	60
CGCGACCCGGGGGCACCTTTAGTGAGGTTCAGGACGCTATGCCATCGGATCCCATGGTC C S P A T S H L W G T Y S P Y F S L E D 60 TGCTCCCCTGCGACTTCTCATCTATGGGGCACGATACTCGCCATACTTTTCGCTCGAGGAC 121		GCG	CTC	GGG	ccc	CCGI	rggz	AAA	rca(CTC	CAAC	3TC	CTG	CGA:	raco	GT.	AGA	CCT	AGG	STAC	CCAG	
TGCTCCCTGCGACTTCTCATGTGGGGCACGTACTCGCCATACTTTCGCTCAGGGAC 121	61	CGC	CGAC	ccc	GGG	GGC/	ACC'	+ · FTT2	AGT	GAG(3TTC	CAGO	BAC	3CT	ATGO	CCA'	TCT	GGA'	rcc(CATO	GTC	120
ACGAGGGGACGCTGAAGAGTAGATACCCCGEGCATGAGCGGTAEGAAAAAGCGAGCTCCTG E L S V S S K L P K D C R I T L V Q V L 80 GAGCTGTCCGTGTCGAGTAAGCTTCCCAAGGATTGCCGGATCACCTTGGTACAGGTGCTA	101	TGO	CTC	CCC	rgc	JAC.	rtc'	rca'	rct2	ATG	GGG	CAC	ATE	CTC	3CC2	ATa	CTT'	TTC	GCT	CGA	GGAC	
GAGCTGTCCGTGTCGAGTAAGCTTCCCAAGGATTGCCGGATCACCTTGGTACAGGTGCTA 181	121	ACC	GAG	GGZ	ACG	CTG	AAG	AGT	AGA'	TAC	CCC	3tg(CAT	GAG	CGG:	rat(GAA.	AAG	CGA	GCT(CCTG	
S R H G A R Y P T S S K S K K Y K K L I 100 TCGCGCCATGGAGCGCGGTACCCAACCAGCTCCAAGAGCAAAAAGTATAAGAAGCTTATE 241 AGCGCGGTACCTCGCGCCATGGGTTGGTCGAGGTTCTCTTTTCATATTCTTCGAACAA T A I Q A N A T D F K G K Y A F L K T Y 120 ACGGCGATCCAGGCTACCAACCAGCTTCAAGGCAAGACACTTTTGAAGAAGCTCA T A I Q A N A T D F K G K Y A F L K T Y 120 ACGGCGATCCAGGCCAATGCCACCGACTTCAAGGGCAAGTACGCCTTTTTGAAGAGCCTAC N Y T L G A D D L T P F G E Q Q L V N S 140 AACTATATCTTGGGTGCGGATGACCTCCCTTTGGGGAGCAGCAGCTGGTGAACTCG G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCAAGTTCTAACGAGGAGTACAAGGCTCTGGCGCGCAGTGTGGTGCCGTTTATTCGC A S G S D R V I A S G E K F I E G F Q Q 180 GCCTCAGGCCTGGACCGATTACCTCCGAGAGAGAACCCCCCCACGAGAGAAAAACATACAGCG A K L A D P G A T N R A A P A I S V I I 200 GCGAACCCACGCCTGGCCGAACAACACCACGGCGAACAACAACACCCACGAGGTCATATT CGCTTCGACCGACCTAGGACCACGCCGCCTTCGCGCGCGC	101	GAG	CTC	TC	CGT	GTC	GAG'	TAA	GCT'	TCC	CAAC	GGA:	rtg(CCG	GAT	CAC	CTT	GGT.	ACA	GGT(GCTA	
TCGCGCCATGGAGCGGGTACCCAACCAGCTCCAAGAGCAAAAAGTATAAGAAGCTTATE 241 AGCGCGGTACCTCGCGCCATGGTTGGTCGAGGTTCTCGTTTTCATATCTTCGAALAA T A I Q A N A T D F K G K Y A F L K T Y 120 ACGGCGATCCAGGCCAATGCCACCGACTTCAAGGCCAAGTACGCCTTTTTGAAAGACGTAC TGCCGCTAGGTCCGGTTACGGTGGTGAAGTTCCCGTTCALGCGGAAAAACTTCTGCATG N Y T L G A D D L T P F G E Q Q L V N S 140 AACTATACTCTGGGTGGAGTCCACTCCCTTTGGGGAACACTGGTGAACTCG TTGATATGAGACCCACGCCTACTGGAGTGAGGGAAAACCCCTCGTCGTCGACCACTTGAGC G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGCACTGTGGTGCCCTTTATTCGC 421 CCGTAGTTCAAGATGGTCTCCATGTTCCGAGACCGCGCGTCACACCACGGCAAATAAGCG A S G S D R V I A S G E K F I E G F Q Q 180 GCCTCAGGCTCGGACCAGGCTTATTGCTTCGGGAGAGAAGTTCATCGAGGGTTCCAGCAG 481 A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGGCCGACTACTGCGCGCGCTCCTCTTCAAGTAGCTCCCCAAGGTCGTC A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGGCTGACCGCGCGCTCCTCTTCAAGTAGCTCCCCAAGGTCGTC A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGGCCGACTAACCAACGACGCCGCCGCTCCCGAGGTTATTTTT GCCTTCGACCGACTGGCCCGACTAACCAACGCGCGCGCTCCGGCATTAATTA	101	CTC	CGA	CAG	GCA(CAG	CTC	ATT	CGA	AGG	GTT(CCT	AAC	GGC(CTA	GTG	GAA	CCA	TGT	CCA	CGAT	
AGCGCGGTACCTCGCGCCATGGGTTGGTCGAGGTTCTCGTTTTTCATATTCTTCGAALAA T A I Q A N A T D F K G K Y A F L K T Y 120 ACGGCGATCCAGGCCAATGCCACCGACTTCAAGGGCAAGTACGCCTTTTTGAAGACGTAC TGCCGCTAGGTCCGGTTACGGTGGCTGAAGTTCCCGTTCALGCGGAAAAAACTTCTGCATG N Y T L G A D D L T P F G E Q Q L V N S 140 AACTATACTCTGGGTGCGGATGACCTCACTCCCTTTGGGAGCAGCTGGTGAACTCG G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCAAGTTCTAACGAGGGTACAAGGCTCTGGCGCGAGTTGTGGTGCCGTTTATTCGC A S G S D R V I A S G E K F I E G F Q Q 180 GCCTCAGGCTCGGACCGGGTTATTGCTTCGGAGAGAAGTTCATCGAGAGGTTCCAGCAG A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGACCGACTAGGACCGACCGCCTCGCGCGCATTAGTGTGATCATCAGAGAGCTGGCGCGCGC	241	TC	GCG	CCA'	rgg	AGC	GCG	GTA	CCC.	AAC	CAG	CTC	CAA	GAG	CAA	AAA	GTA	TAA	GAA	GCT'	TaTt	
ACGGCGATCCAGGCCAATGCCACCGACTTCAAGGGCAAGTACGCCTTTTTGAAGACGTAC TGCCGCTAGGTCCGGTTACGGTGGCTGAAGTTCCCGTTCALGCGGAAAAACTTCTGCATG N Y T L G A D D L T P F G E Q Q L V N S 1400 AACTATACTCTGGGTGCGGATGACCTCCCTTTGGGGAGCAGCAGCTGGTGAACTCG TTGATATGAGACCCACGCCTACTGGAGTGAGGGAAAACCCCTCGTCGTCGACCACTTGAGC G I K F Y Q R Y K A L A R S V V P F I R 1600 GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGACACCACGCGAAATAAGCG CCGTAGTTCAAGATGGTCTCCATGTTCCGAGACCGCGCGTCACACCACGGCAAATAAGCG A S G S D R V I A S G E K F I E G F Q Q 1800 GCCTCAGGCTCGGACCGGGTTATTGCTTCGGAGAGAAGATTCATCGAGGGGTTCCAGCAG CGGAGTCCGAGCCTGGCCCAATAACGAAGCCCTCTCTTCAAGTAGCTCCCCAAGGTCGTC A K L A D P G A T N R A A P A I S V I I 2000 GCGCTTCGACCGACTAGGACCGCGCTGCTCGCCGCGCGATTAGTGTGATTATT CGCTTCGACCGACTAGGACCGCGCTGCTTGCCGCGGCGATTAGTGTGATTATT CGCTTCGACCGACTAGGACCGCGCTGCTTGCCGCGGCGATTAGTGTGATTATT CGCTTCGACCGACTAGGACCGCGCGCTCCTCCGCCGCGATTAGTCACACTAATAA P E S E T F N N T L D H G V C T K F E A 2200 CCGGAGGCGAGACGTTCAACAATACGCTGGACCACGGTGTTGTGCACGAAGTTTGAGGCG 601	2-1-1	AG	CGC	GGT2	ACC'	TCG	CGC	CAT	GGG	TTG	GTC	GAG	3TT	CTC	GTT'	TTT	CAT	ATT	CTT	CGA	AtAa	
TGCCGCTAGGTCCGGTTACGGTGGCTGAAGTTCCCGTTCAtgCGGAAAAACTTCTGCATG N Y T L G A D D L T P F G E Q Q L V N S 140 AACTATACTCTGGGTGCGGATGACCTCACTCCCTTTGGGGAGCAGCTGGTGAACTCG TTGATATGAGACCCACGCCTACTGGAGTGAGGGAAACCCCTCGTCGACCACTTGAGC G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGCGAGTGTGGTGCCGTTTATTCGC 421+	301	AC	GGC(GAT(CCA	GGC	CAA	TGC	CAC	CGA	CTT	CAA	GGG	CAĄ	GTa	cGC	CTT	TTT	GAA	GAC	GTAC	
AACTATACTCTGGGTGCGATGACCTCACTCCCTTTGGGGAGCAGCTGGTGAACTCG 361 TTGATATGAGACCCACGCCTACTGGAGTGAGGGAAACCCCTCGTCGTCGACCACTTGAGC G I K F Y Q R Y K A L A R S V V P F I R 160 GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGCAGTGTGGTGCCGTTTATTCGC 421 CCGTAGTTCAAGATGGTCTCCATGTTCCGAGACCGCGCGCAACAAAAAAGCG A S G S D R V I A S G E K F I E G F Q Q 180 GCCTCAGGCTCGGACCGGGTTATTGCTTCGGGAGAGAAGTTCATCGAGGGGTTCCAGCAG 481 CGGAGTCCGAGCCTGGCCCAATAACGAAGCCCTCTCTTCAAGTAGCTCCCCAAGGTCGTC A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGGCTGATCCTGGCGGAACCGCCCCCTCCGGCGATTAGTGTGATTATT CGCTTCGACCGACCTAGGACCGCGCTGCTTCGGCGGAGGCGCTAATCACACTAATAA P E S E T F N N T L D H G V C T K F E A 220 CCGGAGAGCGAGAGCCGTTCAACAATACGCTGGACCACCGGCGAAGTTTGAGGCG 601	302	TG	CCG	CTA	GGT	CCG	GTT.	ACG	GTG	GCT	GAA	GTT(CCC	GTT	CAt	gCG	GAA	AAA	CTT	CTG	CATG	
G I K F Y Q R Y K A L A R S V V P F I R GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGCAGTGTGGTGCCGTTTATTCGC 421	361	AA(CTA'	TAC'	TCT	GGG'	TGC	GGA +	TGA	CCT	CAC'	TCC:	CTT 	TGG	GGA	GCA 	GCA	GCT +	GGT	GAA	CTCG	
GGCATCAAGTTCTACCAGAGGTACAAGGCTCTGGCGCGCAGTGTGGTGCCGTTTATTCGC 421																						160
A S G S D R V I A S G E K F I E G F Q Q 180 GCCTCAGGCTCGGACCGGGTTATTGCTTCGGGAGAAGATTCATCGAGGGGTTCCAGCAG 481	421	GG	CAT	CAA	GTT -+-	CTA 	CCA	GAG +	GTA	.CAA	.GGC	TCT +	GGC 	GCG	CAG -+-	TGT	GGT	'GCC	GTT	TAT	TCGC	
GCCTCAGGCTCGGACCGGGTTATTGCTTCGGGAGAGAGTTCATCGAGGGGTTCCAGCAG 481																						180
A K L A D P G A T N R A A P A I S V I I 200 GCGAAGCTGGCTGATCCTGGCGCGACGAACCGCGCCGCTCCGGCGATTAGTGTGATTATT 541+++++	481	GC 	CTC	AGG	CTC -+-	GGA	.CCG	GGT +	TAT	TGC	TTC	GGG +	AGA 	GAA 	GTT. -+-	CAT	CGA	+	GTT	CCA	GCAG	
GCGAAGCTGGCTGATCCTGGCGCGACGAACCGCGCCGCTCCGGCGATTAGTGTGTATTATT 541+++																						200
PESETFNNTLDHGVCTKFEA 220 CCGGAGAGCGAGACGTTCAACAATACGCTGGACCACGGTGTGTGCACGAAGTTTGAGGCG 601+++++	541	GC	GAA	GCT	GGC -+-	TGA	TCC	TGG	CGC	GAC	GAA	.CCG +	CGC	CGC	TCC	:GGC	GAT	TAC	TGT	GAT	TTATT +	600
CCGGAGAGCGAGACGTTCAACAATACGCTGGACCACGGTGTGTGCACGAAGTTTGAGGCG	٠																					
	601	CC	GGA	GAG	CGA	- 	- - -	CAA	CAA	TAC	GCT	GGA +	CCA	CGG	TGT	GTC	GCAC	GA/	AGTT	TGA	+ GGCG	660

Fig. 9a

PROVED O.G. FIG.

BY CLASS SUBCLASS
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			.~~	1007	ת את	CAC	V GTT	יכככ	144	רממי	ידידיר	'ACT	GCG	CTC	TTT	ĽGC₽	ACCC	JGA	I CAT(CCGA	240
				. _	. -		+ -	-						- +	- -		+			+ GGCT	720
	001	יככי	TC+C	מבטר	1ΔΔ0	CAT	L [CT]	rcc:	rgg(CGT	BACC	3CTC	BAC	\GA(CGA	3GA(ÇG'I"	IGT	CAG	ICTA	260
721	CGI	 AGC(ga(-+ 3CT(TTC	CGTA	AGAZ	AGG	ACC	GCA(r CTG(CGAC	CTG	-+-· rct(GCT(CCT	GCA	ACA	GTC	+ AGAT	780
	א ידיר	CAC	_ግ አጥረ	יטידיב	רכככ	ኋጥጥር	D IGA:	rac	GGT	AGC	GCG (CACC	CAG	D CGA	CGC	S AAG'	Q TCA	L GCT	S GTC.	P ACCG	280
781	TAC	CCT	TAC	-+- CAC	Agg(CAA	ACT	ATG(CCA'	rcg	CGC	GTG	GTC(GCT(GCG'	TTC	AGT	CGA	CAG	TGGC	040
	F TT	التاليات.	ייי דריאז	L ACT	ידידיר	ים בי	H TCA	CAA'	TGA	GTG	GAA(GAA	GTA(CgA	CTA	CCT	TCA	GTC	L CTT	GGGC	300
841	AA	GAC	AGT'	rga(GAA(GTG	AGT	GTT.	ACT	CAC	CTT	CTT	CAT	GCT	GAT	GGA	AGT	CAG	GAA	+ CCCG	900
	Δ Δ(чтΔ	СТД	CGG	СТА	CGG	CGC.	AGG	CAA	CCC	TCT	GGG:	ACC	GGC	TCA	GGG	GAT	'AGG	GTT	T CACC	320 960
901	TT	 CAT	GAT	-+- GCC	GAT	GCC	GCG	TCC	 GTT	GGG	AGA	CCC'	TGG	CCG	AGT	CCC	CTA	TCC	CAA	.GTGG	
	N AA	രവ	CCT	СДТ	тас	CCG	L GTT	GAC	aCG	TTC	GCC	AGT	GCA	GGA	.CCA	CAC	'CAG	T	N TAA	S CTCG	340
961	 TT	 GCT	 CGA	-+- CTA	acg	GGC	+ CAA	ctg	cGC	AAG	+	TCA	CGT	CCT	GGT	GTG	GTC	GTO	TTA	GAGC	1020
	ה מכי	L TCT	יבאמי	S CTC	N CAA	CCC	GGC	CAC	F CTT	ccc	GTT	N GAA	.CGC	TAC	CAT	Y GTA	CGI	CGI	F ACTI	S TTCA	360
1021	TG	aga	TCA	-+- GAG	GTT	GGG	CCG	GTG	GAA	.GGG	CAA	CTT	GCG	ATG	GTA	CAT	GCZ	\GCT	rga <i>i</i>	AAAGT	1080
	CA	D .CGA	N CAA	S .CAG	CAT	V GGT	TTC	CAT	F CTT	CTT	TGC	L ATT	'GGC	CCI	GT	N ACAA	ACGO	3CA(E CTG/	P	380
1081	GI	'GC'I	GTI	GTC	GTA	CCA	AAC	GTA	AGAA	GAA	ACC	TAA	CCC	GGF	ACA7	'GT'	rgco	CGT	GAC"	rtggg	
	TUT	стс	ccc	GAC	CTC	CGGT	rgg <i>i</i>	AAA	CGC	CAZ	AGGA	LTA	GGF	ATGO	GT	TT	CTG	CAT	CCT	GGTG	400 1200
1141	ΑÀ	CAC	GGC	CTG	GAG	GCF	ACCI	TTT	CGCC	GTT	rcc1	'AAT'	ACCI	CAC	CA.	PAA(3AC	3TA	GGA(CCCAC	
	GT	GCC	TTT	CGC	GCGC	CGCC	GAG	CTI	ACT"	rcg <i>i</i>	AGA(CGA'	rgc?	TA	3CA2	AGT	CGG	AAA	AGG	AGCCT	420
1201	CI	ACGO	JAAF	AGC	CGCC	GCGC	CTC	GA.	rga/	AGC.	rcto	3CT <i>I</i>	ACG:	rta(CGT'	rca(GCC'	TTT	TCC'	TCGGA	
	C	rrg:	rrco	GCG	CTT:	rga:	TTA	ATG	ACC	GGG'	rtg:	rgco	CAC	rgc	ATG	GCT(GCG.	ATG	TGG.	ACAAC	440
1261	G7	AAC	AAG	+·	GAA	ACT	 AAT'	+ ' 'FAC'	rgg(ccci	AAC	ACG	GTG/	+ ACG'	TAC	CGA	 CGC	+ TAC	ACC	+ TGTTC	· 1320

	L	G	R	С	K	L	N	D	F	v	K	G	L	s	W	A	R	S	G	G	460
	-														_		-	-		GGGC	
1321				•																+ CCCG	1380
	GΑ		CGC	IAC	GII	CGA	CII	MC I	GAA	ACA	GII	-	TWW	$c_{1}c$	AAC	CCG	G_{IC}	TMO	ACC	CCCG	

N W G E C F S * 467
AACTGGGGAGAGTGCTTTAGTTGA

1381 -------1404
TTGACCCCTCTCACGAAATCAACT

APPROVED

CP-1

31/56

ECO RI M G V F V V L L S I A T L F G S T
TATATGAATTCATGGGCGTGTTCGTCGTGCTGCTCCATTGCCACCTTGTTCGGTTCCA

1 -----+ 60

ATATACTTAAGTACCCGCACAAGCAGCACGATGACAGGTAACGGTGGAACAAGCCAAGGT SGTALGPRGNSHSCDTVDGG CATCCGGTACCGCCTTGGGTCCTCGTGGTAATTCTCACTCTTGTGACACTGTTGACGGTG 61 -----+ 120 GTAGGCCATGGCGGAACCCAGGAGCACCATTAAGAGTGAGAACACTGTGACAACTGCCAC CP-2 CP-3 YQCFPEISHLWGQYSPYFSL GTTACCAATGTTTCCCAGAAATTTCTCACTTGTGGGGTCAATACTCTCCATACTTCTCTT 121 -----+ 180 CAATGGTTACAAAGGGTCTTTAAAGAGTGAACACCCCAGTTATGAGAGGTATGAAGAGAA E D E S A I S P D V P D D C R V T F V Q 181 -----+ 240 ACCTTCTGCTTAGACGATAAAGAGGTCTGCAAGGTCTGCTGACATCTCAATGAAAGCAAG CP-5.7 V L S R H G A R Y P T D S K G K K Y S A AAGTTTTGTCTAGACACGGT**GCTAGATACCCAACTgacTCTAAGggtAAGaagTACTCTG** 241 ----+ 300 TTCAAAACAGATCTGTGCCACGATCTATGGGTTGActgAGATTCccaTTCttcATGAGAC LIEAIQKNATAFKGKYAFLK CTTTGATTGAAGCTATTCAAAAGAACGCTACTGCTTTCAAGGGTAAGTACGCTTTCTTGA 301 -----+ 360 GAAACTAACTTCGATAAGTTTTCTTGCGATGACGAAAGTTCCCATTCATGCGAAAGAACT CP-6 CP-7 T Y N Y T L G A D D L T P F G E N Q M V AGACTTACAACTACACTTTGGGTGCTGACGACTTGACTCCATTCGGTGAAAACCAAATGG 361 -----+ 420 TCTGAATGTTGATGTGAAACCCACGACTGCTGAACTGAGGTAAGCCACTTTTGGTTTACC NSGIKFYRRYKALARKIVPF TTAACTCTGGTATTAAGTTCTACAGAAGATACAAGGCTTTGGCTAGAAAGATTGTTCCAT 421 -----+----+ 480 AATTGAGACCATAATTCAAGATGTCTTCTATGTTCCGAAACCGATCTTTCTAACAAGGTA CP-8.7 CP-9 IRASGSSRVIASAEKFIEGF TCATTAGAGCTTCTGGTTCTtctAGAGTTATTGCTTCTGCTGAAAAGTTCATTGAAGGTT

481 -----+ 540
AGTAATCTCGAAGACCAAGAagaTCTCAATAACGAAGACGACTTTTCAAGTAACTTCCAA

Q S A K L A D P G S Q P H Q A S P V I D

TCCAATCTGCTAAGTTGGCTGACCCAGGTTCTCAACCACCCAAGCTTCTCCAGTTATTG

541 ----+ 600

AGGTTAGACGATTCAACCGACTGGGTCCAAGAGTTGGTGTTCGAAGAGGTCAATAAC

PPROVED O.G. FIG.

BY CLASS SUBCLASS
AFTSMAN

32/56

CP-10.7 CP-11.7 V I I S E A S S Y N N T L D P G T C T A **ACGTT**ATTATTtctGAcgctTCTtctTACAACAACACTTTGGACccaGGT**ACTTGTACTG** 601 -----+-----+ 660 TGCAATAATAAagaCTgcgaAGGagaATGTTGTTGTGAAACCTGggtCCATGAACATGAC EDSELADTVEANFTALFAP CTTTCGAAGACTCTGAATTGgctGACactGTTGAAGCTAACTTCACTGCTTTGTTCGCTC 661 -----+ 720 **GAAAGCTTCT**GAGACTTAACcgaCTGtgaCAACTTCGATTGAAGTGACGAAACAA**GCGAG** AIRARLEADLPGVTLTD<u>T</u>EV **CAGCTATTAGAGCTA**GATTGGAAGCTGACTTGCCAGGTGTTACTTTGACTGACactgaaG 721 ----+ 780 CP-13.7 TYLMDMC<u>S</u>FETVARTSDATE TTactTACTTGATGGACATGTGTtctTTCGAAACTGTTGCTAGAACTTCTGACGCTACTG 781 -----+ 840 **AAtgaATGAACTACCTGTAC**ACAagaAAGCTTTGACAACGATCTTGAAGACTGCGATGAC LSPFCALFTHDEWR<u>H</u>YDYLQ **AATTGTCTCCATTCTGTGCTTTGTT**CACTCACGACGAATGGAGACaCTACGACTACTTGC 841 -----+ TTAACAGAGGTAAGACACGAAACAAGTGAGTGCTGCTTACCTCTgtgATGCTGATGAACG CP-15.7 SLKKYYGHGAGNPLGP<u>T</u>QGV AATCTTTGaagAAGTACTACGGTcacGGTGCTGGTAACCCATTGGGTCCAactCAAGGTG TTAGAAACttcTTCATGATGCCAgtgCCACGACCATTGGGTAACCCAGGTtgaGTTCCAC FANELIARLTRSPVQDHTS TTGGTTTCGCTAACGAATTGATTGCTAGATTGACTAGATCTCCAGTTCAAGACCACACTT 961 -----+ 1020 AACCAAAGCGATTGCTTAACTAACGATCTAACTGATCTAGAGGTCAAGTTCTGGTGTGAA CP-16 CP-17.7 TNHTLDSNPATFPLNATLYA CTACTAACCACACTTTGGACTCTAACCCAGCTACTTTCCCATTGAACGCTACTTTGTACG 1021 -----+ 1080 GATGATTGGTGTGAAACCTGAGATTGGGTCGATGAAAGGGTAACTTGCGATGAAACATGC D F S H D N G I I S I F F A L G L Y N G CTGACTTCTCACGACAACggtattATTTCTATTTTCTTCGCTTTGGGTTTGTACAACG 1081 -----+ 1140 GACTGAAGAGAGTGCTGTTGccataa**TAAAGATAAAAGAAGCGAAACCCAAACATGTTGC** CP-18.7 CP-19.7 TAPLSTTSVESIEETDGYSS GTACTGCTCCATTGTCTACTACTTCTGTTGAATCTATTGAAGAAACTGACGGTTACTCTt 1141 -----+ 1200 CATGACGAGGTAACAGATGATGAAGACAACTTAGATAACTTCTTTGACTGCCAATGAGAa

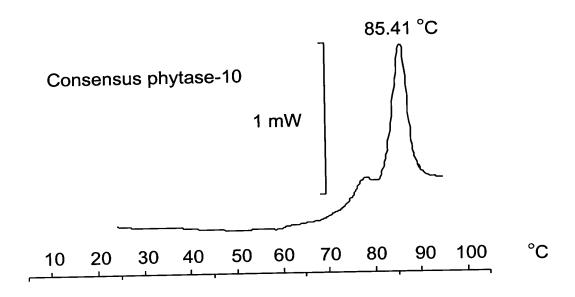
Fig. 10b

APPROVED	0.G. F	IG.
BY	CLASS	SUBCLASS
DRAFTSMAN		

1201	ctac	tTG	GAC	TGT	TCC.	ATT	Cgc	ttc	tAG	AGC	TTA	V . CGT1	[GA	AAT	GAT	GCA	ATG	TCA	AGC	E TG -+	1260
1201	gace	gaAC	CTG	ACA	AGG'	TAA	Gcg	aag	aTC	TCG.	AAT	G CA CP	\CT ' -20	TTA	CTA	.CGT	TAC	AGT	TCG	AC	
1261	AAA	AGGA	ACC	ATT	GGT	TAG 	AGT +	TTT 	GGT	TAA -+-	.CGA		V AGT' +	V TG1	P TCC	ATI	'GCA +	.CGG	TTG 	TG -+	1320
	V CTG:	D FTG	K CAA	L .GTT	G ' GGG	R TAG	C ATG	K T AA	R .GAG	D B AGA	D .CGA	F CTT	V C GT	E T G #	G AGG	L TTI	S GTC	F TTI	A CGC	R TA	
1321			. +	. -			+	- - -		-+-		GAA	+		TCC		+	-		-+	1380
1381	S GAT		TGG	TAA	CTG		TGA +	ATG	TTT:	CGC	TT.	Ecc AGA:	ATT +	CA7	· -	- 14	126				

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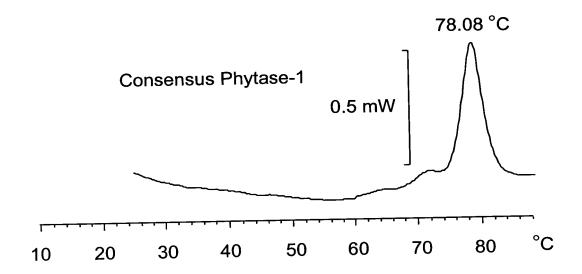
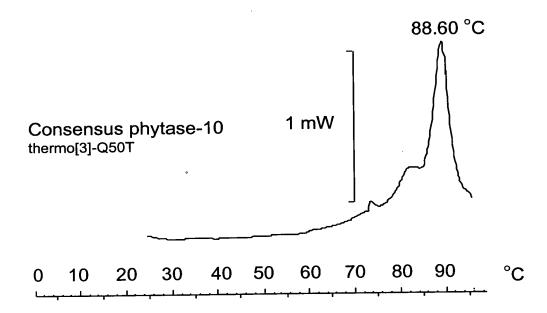


Fig. 11

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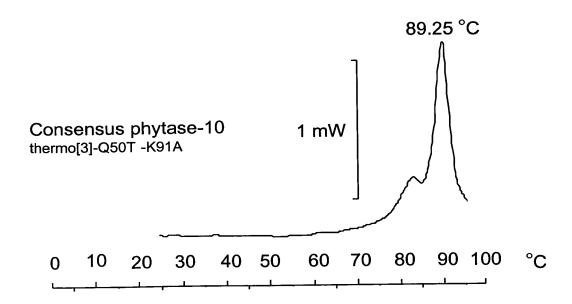


Fig. 12



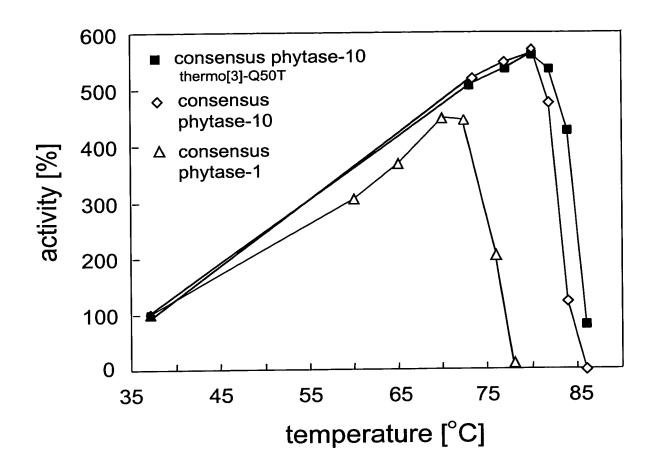


Fig. 13



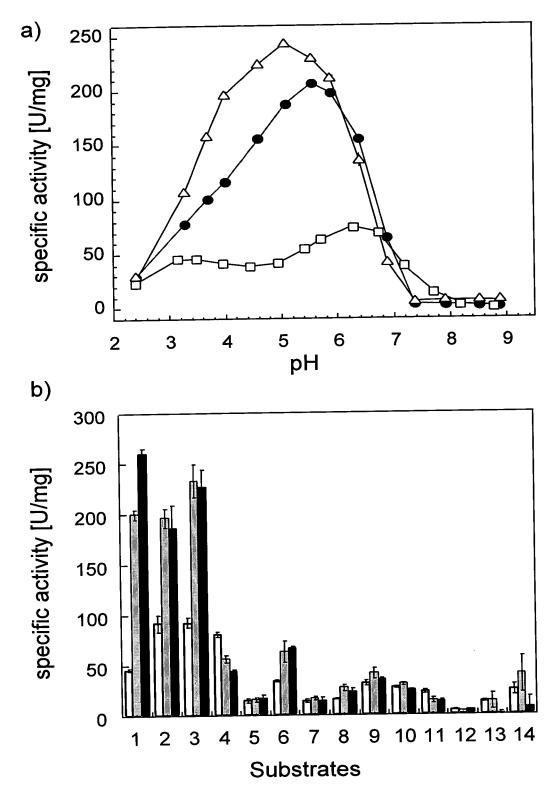
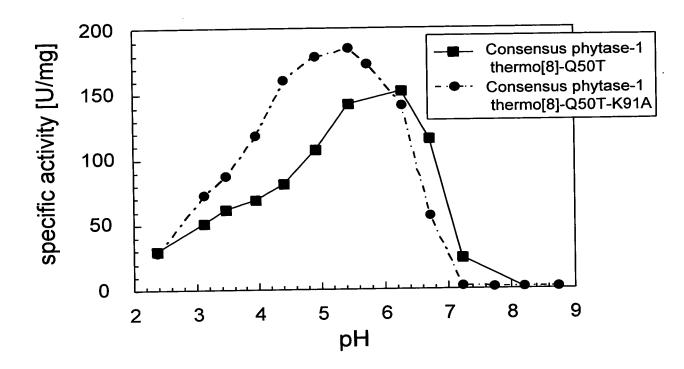


Fig. 14

O9488265.012000

CLASS SUBCLASS

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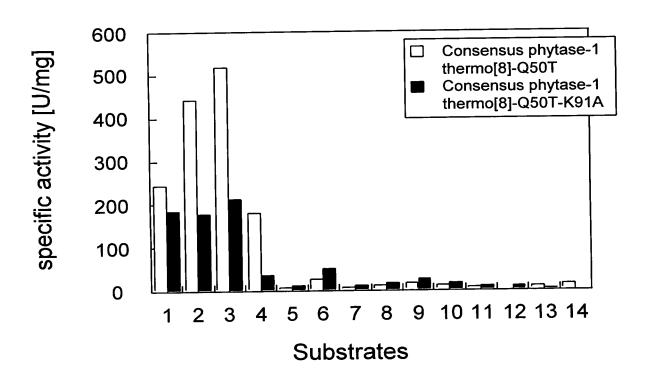


Fig. 15

oorases.cleac

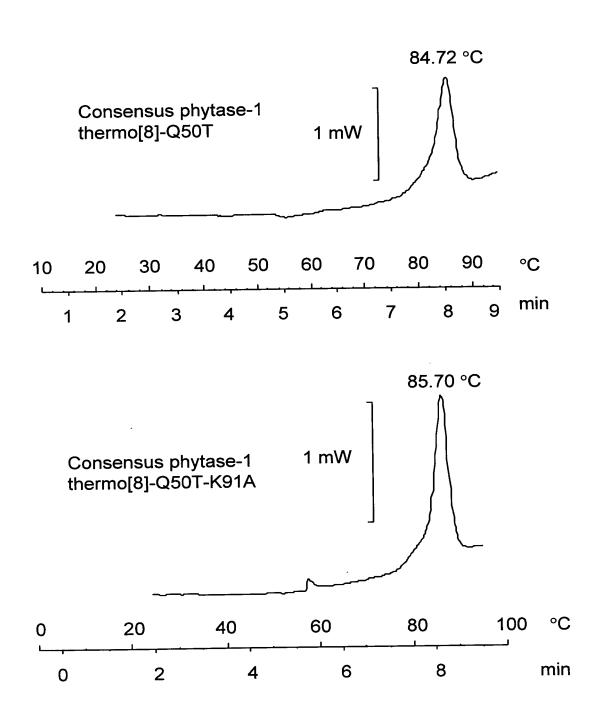
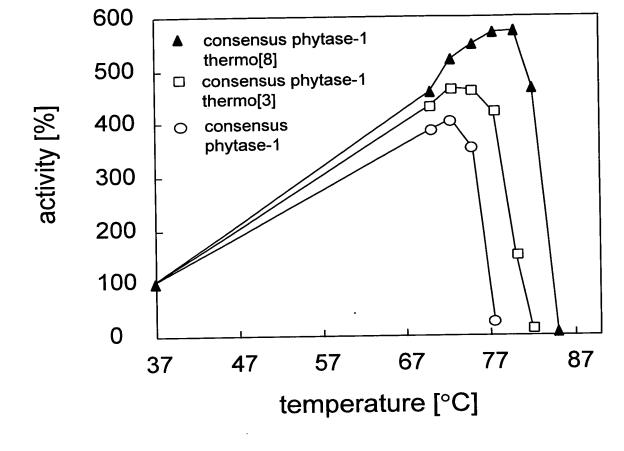


Fig. 16

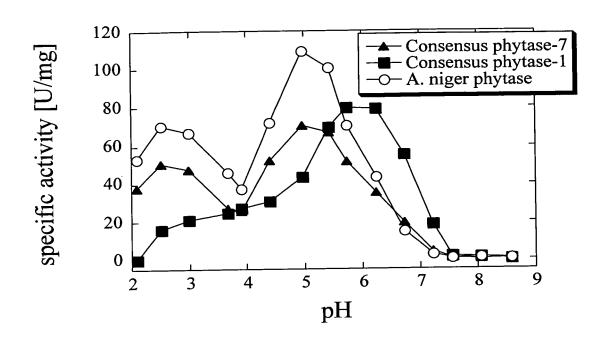


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Fig. 17

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41/56



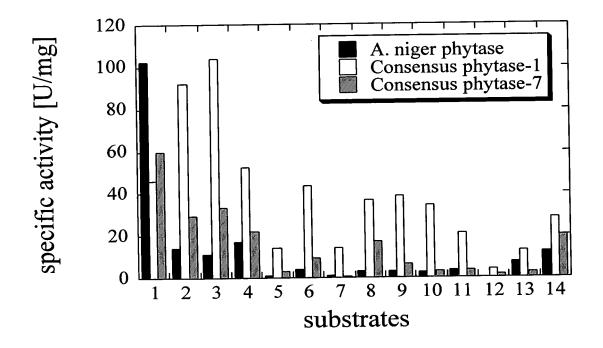
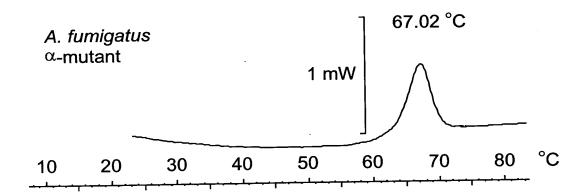


Fig. 18





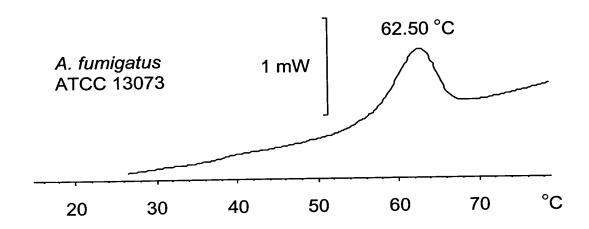
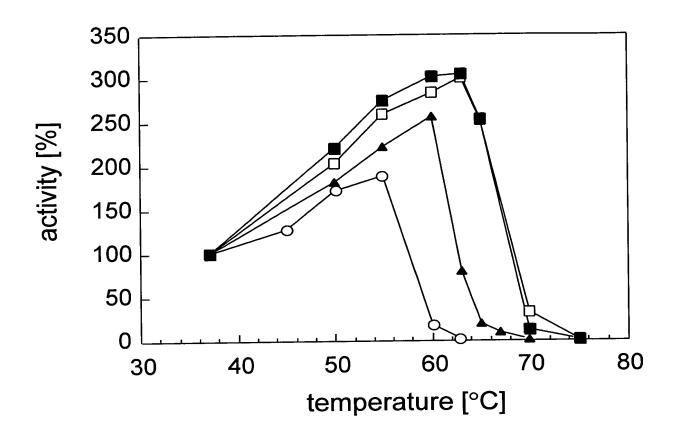


Fig. 19

43/56



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Fig. 20

APPROVEO	0.G. F	IG.
BY	CLASS	SUBCLASS
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1	MGVFVVLLSI	ATLFGSTSGT	ALGPRGNSHS	CDTVDGGYQC	FPEIS <u>SN</u> W <u>SP</u>
51	YSP <u>Y</u> FSLADE	SAISPDVPKG	CRVTFVQVL <u>Q</u>	RHGAR <u>F</u> PTS <u>G</u>	A <u>ATRI</u> SALIE
101	AIQKNATAFK	GKYAFLKTYN	YTLGADDL <u>V</u> P	FG <u>ANQSSQA</u> G	IKFYRRYKAL
151	ARKIVPFIRA	sgsdrvi <u>d</u> sa	<u>TNW</u> IEGFQSA	KLADPGANPH	QASPVINVII
201	PEGAGYNNTL	DHGLCTAFEE	SELGDDVEAN	FTAVFAPPIR	ARLEAHLPGV
251	NLTDEDVVNL	MDMCPFDTVA	RTSDATELSP	FCDLFTHDEW	IQYDYL <u>GD</u> L <u>D</u>
301	KYYG <u>T</u> GAGNP	LGPAQGVGFV	NELIARLTHS	PVQDHTSTNH	TLDSNPATF
351	LNATLYADFS	HDNTMV <u>A</u> IFF	ALGLYNGTKP	LSTTSVESIE	ETDGYSASWI
401	VPF <u>S</u> ARMYVE	MMQCEAEKEP	LVRVLVNDRV	VPLHGCGVDK	LGRCKRDDF\
451	EGLSFARSGG	NWEECFA			

	ATC	GGG	CGTG	TTC	GTC	GTG	CTA	CTC	TCC	CTAC	rgco	CAC	CTT	GTT(CGG'	TTC	CAC	ATC	CGG:	TACC	60
1	TAC	CCC	CAC	+ 'AAC	CAG	CAC	-+- :GA]	GA	CAGO	TA	ACG(3TG(JAA(CAA	GCC	AAG	GTG'	TAG	GCC2	ATGG	
					v			L	s	I		T	L	F	G	s	т	s	G	т	-
61				+	- - -		+-		- -	- -	+	<i>-</i>	- - -	-+-			+			ATGT	120
	CGG													ACA V		GCC G	ACC. G	AAT Y		TACA	_
	A	L	G	Р	R	G	N	S	Н	S	С		_	•					~		
121				- +			+			-	+			-+-			+			CGAA + GCTT	180
	AA(3GG' P	rcti E	ΓΤΑ <i>!</i> Ι	AAG <i>i</i> S	AGTO H	jaa: L	UAC) W	G		y Y		AGG P		F		L L		D	E	_
	- тс	TGC'	татт	rtci	rccz	AGA	CGT	CCC.	AAA	GGA	CTG	TAG	AGT	TAC	TTT:	'CG'I	TCA	AGT	TTT	GTCT	
181	AG	- - - ACG	 XATA	+ AAG	AGG'	 rct	+ GCA	ggg	 TTT	 CCT	+ GAC	- - - ATC	TCA	-+- ATG	AAA	.GCA	AGT	TCA	AAA	+ .CAGA	240
	s	A	I	s	P	D	v	P	K	D	С	R	v	Т	F	v	Q	v	L	s	-
241				-+-			+	- - -			+			-+-		-	+		- 	TGAA	300
	TC	TGT	GCC	ACG	ATC'	TAT	GGG	TTG	AAG	AAG	ATT	CAG	ATI	CCC	TAA	'GAC	ACC	AAA	CTA	ACTT	
	R	н	G	A	R	Y	P	T	s	s	К	s	K	A	Y	s	A	L	I	E	-
301				-+-			+				+			-+-			+	- - -	-	CAAC	360
	CG	ATA	AGT	TTT	CTT	GCG	ATG	ACG	AAA	GTT.	'CCC	'AT'I	CAT	rgco	3AA?	AGAZ	ACTI	ГСТС	AA'I	GTTG	
	A	I	Q	K	N	A			F						F				Y	N	-
361				-+-			+	. – –	-		+			+		·		+ -	- - -	TGGT +	420
			AAA L																	G G	_
	ΣΠ	מידיי	ሊርታጥ	'СΤΆ	CAG	AAG	:ATA	CAF	\GGC	TTT	rggo	CTAC	SAAZ	AGA'	TTG:	rtc(CAT'	rca:	TAC	GAGCT	
421		. .	. -	-+-	. _	-	· - - +			- 	- +	-		+		-		+		+ CTCGA	480
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481				-+-	. .			 -	- -	- -	-+-			+	- 	-		+		CTGCT + GACGA	540
																				A	

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		TTG	GCT	GAC	CCA	GGI	TCT	CAA	ACCF	CAC	CCAZ	AGC'	rtc'	rcc: -+-	AGT' 	ГАТ' 	+			+	600
541	TTC	AAC	CGA	CTG	GGI	CCA	AAGI	AGTT	rgg?	rgto	GGT	rcg	AAG	AGG'	TCA	ATA	ATT	GCA(CTAC	TAA	
	K	L	A	D	P	G	s	Q	P	н	Q	A	s	P	V	I	N	V	I	I	-
601	CCA	.GAA	GGA	ATCC	GGT	TAC	CAA	CAA	CAC:	TTT(3GA(CCA'	TGG	TCT -+-	TTG - - -	TAC	TGC'	TTT 	CGA	AGAC	660
601	GGI	'CTI	CCI	rago	GCCF	TA	3TT(GTT(GTG	AAA	CCT	GGT.	ACC	AGA	AAC	ATG	ACG	AAA	GCT'	rctg	
	P	E	G	s	G	Y	N	N	T	L	D	н	G	L	С	Т	A	F	E	D	-
661				- +		- - - :	+			-	+	-		-+-			+		- - -	TAGA	720
991	AGA	TG	GA.	rcc <i>i</i>	ACTO	GCT(GCA.	ACT'	TCG.	ATT	GAA	GTG	ACG	AAA	CAA	.GCG	AGG	TCG	ATA.	ATCT	
	s	т	L	G	D	D	v	E	A	N	F	т	A	L	F	A	P	A	I	R	-
721							- - +			 -	+			-+-			+	. – – –		CTTG	780
	CGI	ATC'	raa(CCT'	TCG	ACT	GAA	CGG	TCC	ACA	ATG	AAA	CTG	ACI	GCI	TCI	'GCA	ACA	AAT	GAAC	
	A	R	L	E	A	D	L	P	G	V	Т	L	Т	D	Е	D	V	V	Y	L	-
781	· 			- + -			+			- - -	+		- - -	- + -		- - -				TCCA	840
	TA	CCT	GTA	CAC.	AGG	TAA	.GCT	GTG	ACA	GCG	ATC									AGGT	
	M	D	M	С	P	F	D			A	R	Т	S	D	Α	Т	Е	L	S	P	-
841		-		-+-			+	. -			+	. – – -		+				+ -		GGGT + CCCA	900
	AA F	GAC C	ACG A	AAA L	.CAA F	T.	H	D.	E.GC	W	I	Q	Y				Q	s		G	_
	_	_					: ጥር:(TGO	TA	ACC	CATT	rgg(GTC(CAG	CTC	AAG	GTG'	rtgo	3TTI	CGCT	
901		- - -		-+-	- - -		4			·	- + - -	- - -		+	-			+		+ AGCGA	960
																			F		-
0.61	AA	.CGA	ATT	GAT	TGC	TAC	3AT'	rga(CTC	ACT(CTC	CAG'	TTC.	AAG +	ACC	ACA 	CTT	CTA	CTA	ACCAC	1020
961	TI	GCI	TA	ACTA	AACC	TAE	CTA	ACT(GAG'	TGA	GAG	GTC.	AAG	TTC	TGG	TGT	GAA	GAT	GAT'	rggtg	
	N	E	L	I	A	R	L	Т	Н	s	Р	v	Q	D	Н	Т	s	T	N	Н	-
1001	AC	TT	rggz	ACTO	CTA	ACC	CAG	CTA	CTT'	TCC	CAT	TGA	ACG	CTA	CTT	TGT	ACG	CTG +	ACT'	TCTC1	1080
1021	TO	AA	ACC:	rga	JAT	rgg	GTC	GAT	GAA.	AGG	GTA	ACT	TGC	GAT	'GAA	ACA	TGC	GAC	TGA	AGAGA	
								_	_	_	_			-	, т	٠,	. 7	г.		c	_

1081	CAC	CGAC	AAC	CACI	TATG	ATA	TCI	TAT'	TTT	TTC	GCT	TTT(3GG:	CTT(- + - ·	ATE	CAA	CGG1	CACC	AAC	CCA	1140
1081	GTO	CTC	TTC	TGF	ATAC	TAT:	AGA	ATA	AAA	AAG	GCG2	AAA	CCC	AAA	CATO	3TT(GCC?	ATGO	TT(CGGT	
	н	D	N	т	M	I	s	I	F	F	A	L	G	L	Y	N	G,	Т	K	P	-
	TTC	STCI	rac:	rac'	rtct	GTT	rga <i>i</i>	ATC:	rat:	rgaz	AGA	AAC'	TGA	CGG'	TTA	CTC	rgc:	rtc:	rtg(GACT	1200
1141	AA	CAG	ATG	ATG	AAGA	CAZ	ACTI	ΓAG	ATA	ACT'	rct'	TTG.	ACT	GCC.	AAT	GAG	ACG	AAG	AAC	CTGA	
	L	s	т	т	s	v	E	s	I	E	E	т	D	G	Y	s	A	s	W	T	-
1201	GT'	rccz	ATT(CGC'	rgc7	raga	AGC.	TTA	CGT	rga.	AAT	GAT	GCA	ATG	TCA	AGC	TGA	AAA	GGA.	ACCA	1260
1201	CA	AGG	raa(GCG	ACG	ATC:	rcg	AAT(GCA.	ACT	TTA	CTA	CGT	TAC	AGT	TCG	ACT'	TTT	CCT	TGGT	
	v	P	F	A	Α	R	A	Y	v	Е	M	M	Q	С	Q	A	E	ĸ	E	P	-
	TT	GGT'	TAG.	AGT'	TTT	GT'	TAA(CGA	CAG	AGT	TGT	TCC	ATT	GCA	.CGG	TTG	TGC	TGT	TGA	CAAG	1320
1261	AA	CCA	ATC	-+- TCA	AAA	CCA	ATT	GCT	GTC	TCA	ACA	AGG	TAA	CGT	GCC	AAC	ACG	ACA	ACT	GTTC	
	L	v	R	v	L	v	N	D	R	v	v	P	L	н	G	C	A	v	D	K	-
	тт	GGG	TAG	ATG	TAA	GAG.	AGA	CGA	CTT	CGT	TGA	AGG	TTT	GTC	TTT:	cgc	TAG	ATC	TGG	TGGT	1380
1321	AA	CCC	ATC	TAC	ATT	CTC	TCT	GCT	GAA	GCA	ACT	TCC	'AAA	CAG	AAA	.GCG	ATC	TAG	ACC	ACCA	
	L	G	R	С	K	R	D	D	F	v	Е	G	L	s	F	A	R	s	G	G	-
1381			-	-+-	ATG TAC		+	- - -	- 1	404	:										

N W A E C F A *

1 -----+ 60 TACCCGCACAAGCACCACGATGACAGGTAACGGTGGAACAAGCCAAGGTGTAGGCCATGG M G V F V V L L S I A T L F G S T S G T ${\tt GCCTTGGGTCCTCGTGGTAATTCTCACTCTTGTGACACTGTTGACGGTGGTTACCAATGT}$ 61 -----+ 120 CGGAACCCAGGAGCACCATTAAGAGTGAGAACACTGTGACAACTGCCACCAATGGTTACA A L G P R G N S H S C D T V D G G Y Q C TTCCCAGAAATTTCTCACTTGTGGGGTACCTACTCTCCATACTTCTCTTTGGCAGACGAA 121 -----+ 180 AAGGGTCTTTAAAGAGTGAACACCCCATGGATGAGAGGTATGAAGAGAAACCGTCTGCTT F P E I S H L W G T Y S P Y F S L A D E TCTGCTATTTCTCCAGACGTCCCAAAGGACTGTAGAGTTACTTTCGTTCAAGTTTTGTCT 181 -----+ 240 AGACGATAAAGAGGTCTGCAGGGTTTCCTGACATCTCAATGAAAGCAAGTTCAAAACAGA S A I S P D V P K D C R V T F V Q V L S 241 -----+ 300 RHGARYPTSSASKAYSALIE GCTATTCAAAAGAACGCTACTGCTTTCAAGGGTAAGTACGCTTTCTTGAAGACTTACAAC 301 -----+ 360 CGATAAGTTTTCTTGCGATGACGAAAGTTCCCATTCATGCGAAAGAACTTCTGAATGTTG A I Q K N A T A F K G K Y A F L K T Y N TACACTTTGGGTGCTGACGACTTGACTCCATTCGGTGAAAACCAAATGGTTAACTCTGGT 361 -----+ 420 ATGTGAAACCCACGACTGCTGAACTGAGGTAAGCCACTTTTGGTTTACCAATTGAGACCA Y T L G A D D L T P F G E N Q M V N S G 421 -----+ 480 IKFYRRYKALARKIVPFIRA TCTGGTTCTGACAGAGTTATTGCTTCTGCTGAAAAGTTCATTGAAGGTTTCCAATCTGCT 481 -----+ 540 AGACCAAGACTGTCTCAATAACGAAGACGACTTTTCAAGTAACTTCCAAAGGTTAGACGA G S D R V I A S A E K F I E G F Q S A

	AAG	TTC	GC1	GAC	CCCI	AGGT	rtc'	rca?	ACC	ACA	CCA	AGC'	TTC'	TCC.	AGT'	TAT 	TAA 	CGT(3AT(CATT	600
541	TTC	'AAC	CGI	CTC	gg:	rccz	AAG	AGT	rgg:	rgr	GGT	TCG.	AAG.	AGG	TCA	АТА	TTA	GCA	CTA	GTAA	
	ĸ	L	A	D	P	G	s	Q	P	Н	Q	A	s	P	v	I	N	v	I	I	-
601			- - -	-+-			+			-	+			- + -			+	-		AGAC + TCTG	660
	P	E	G	S	G	Y	N	N	T	L	D				С		A	F	E	D	_
	TC:	raco	CCT	AGG'	TGA	CGA	CGT	TGA.	AGC	TAA	CTT	CAC	TGC	TTT	GTT	CGC	TCC	AGC	TAT	TAGA	720
661	AG	ATG	GA'	rcc.	ACT	GCT	GCA	ACT	TCG	ATT	GAA	GTG	ACG	AAA	CAA	.GCG	AGG	TCG	АТА	ATCT	
	s	Т	L	G	D	D	V	E	A	N	F	Т	A	L	F	A	P	A	Ι	R	-
721			- - -	-+-	<u></u>	-	+			- - -	+		- - -	-+-	- - -	-	+	- - -		CTTG + GAAC	780
	Α	R	L	E	A	D	L	P	G	v	т	L	т	D	E	D	v	v	Y	L	-
781		- - -	- - -	-+-		-	+	. -			+			-+-			+			TCCA + AGGT	840
	М	D	М	С	P	F	D		v			т		D	Α	_	E	L	s	P	-
841		- - -		-+-		- - -					- +		- -	+ -	·	- -		-		GGGT + ACCCA	900
	F	C	A	L	F	Т	Н	D	E	W	I	Q		D				s	L	G	-
901				-+-	. 	-	4				-+-	- ·		+				+ •		CGCT	960
																				AGCGA A	<u> </u>
	7\7\	്രവ	ייי ע	ימטי	r ጥ ር}(מידי:	TAF	TGAG	CTC	ACT	CTC	CAG'	TTC	AAG.	ACC.	ACA	CTT	CTA	CTAZ	ACCAC	1000
961	 TT	GCI	- - -	CT?	AAC	TAE	CTA	+ ACT	GAG'	rga	-+- GAG	GTC	AAG	+ TTC	TGG	TGT	GAA	GAT	GAT'	rggtg	1020
	N	E	L	I	A	R	L	т	Н	s	P	V	Q	D	н	Т	s	т	N	Н	-
1021				+			- - -	+			-+-	- - -		+				+	-	TCTCT + AGAGA	. 1080
	TC	AAA	ACC"	rGA(ΉAΊ"	エ・マ・ピ・(J.C.	GA'I'	GAA.	AUG	GIA	ACI	130	JAI	UMM	. ion					-

					- -		+ -			- -	+			-+-			+			GCCA	1140
1081	GTO	CTC	3TTC	GTG/	ATA	CTAT	raga	ATA)AA)AAE	GCG/	AAA	CCC	AAA	CAT	GTT	GCC.	ATG(GTT(CGGT	
	н	D	N	Т	M	I	s	I	F	F	A	L	G	L	Y	N	G	Т	K	P	-
1141					_ <i>_</i>		+-				+		-	-+-			+	- - -		GACT	1200
1141	AA	CAG	ATG	ATG	AAG	ACAZ	ACT"	rag	ATA	ACT'	TCT	TTG	ACT	GCC	AAT	GAG	ACG	AAG	AAC	CTGA	
	L	s	т	т	s	V	E	s	I	E	E	Т	D	G	Y	s	A	S	W	T	-
1201			<u></u>	- + -			+		- - -		+		- - -	-+-			+			ACCA	1260
1201	CA	AGG	TAA	GCG	ACG	ATC'	TCG.	TAA	GCA	ACT	TTA	.CTA	CGT	TAC	AGT	TCG	ACT	'TTT	CCT	TGGT	
					A															P	-
1261				-+-			+				+			-+-					-	CAAG	1320
1201	AA	CCA	ATC	TCA	AAA	CCA	ATT	GCT	GTC	TCA	ACA	AGC	TAP	ACGI	:GCC	CAAC	CACG	BACA	AC'I	GTTC	
																				K	
1321			. _	+ -			+				+			+-				 -		TGGT +	1380
1521	AA	.CCC	TATC	CTAC	CATI	CTC	TCT	'GC'I	GAA	\GC#	AACT	TCC	CAAZ	ACAC	AAE	AGC(JAT(CTAC	BACC	CACCA	
	L	G	R	С	K	R	D	D	F	V	E	G	L	s	F	A	R	s	G	G	-
1381					ATC					L404	1										
1301					CAT																
	N	W	A	E	С	F	Α	*													

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j	ATG	:GGC	GTG	TTC	CGTC	GTG	CTA	CTG	TCC	ATT	GCC	ACC	TTC	3TT(CGG'	TTC	CAC	AT(CCG	GTA	CC -+	60
1	TAC	CCC	CAC	CAAC	CAC	CAC	GAT	GAC	AGG	TAA	CGC	TGC)AAE	CAA	GCC.	AAG	GTG	AT	GGC	CAI	rgg	
	M	G	•	F		V											Т					-
	GCC	CTTC	GG:	rcc:	rcg:	rgg'	raan	rTC7	CAC	TCT	TG	rga(CAC'	TGT -+-	TGA 	.CGG	TGC	TT: 	ACC	AA'	TGT +	120
61	CGC	JAA(CCC	AGG	AGC	ACC	ATT?	AAGA	AGTO	BAGA	AAC	ACT	GTG.	ACA	ACT	GCC	ACC	CAA	TGG	TT	ACA	
	A	L	G	P	R	G	N	s	Н	s	С	D	Т	V	D	G	G	Y	Č	Q	C	-
	TT	CCC	AGA	AAT'	TTC'	TCA	CTT	GTG(GGG:	rac <i>i</i>	ATA	CTC	TCC	ATT	CTT	CTC	TT7	rgg +	CTG	AC	GAA +	180
121	AA(ggg'	 TCT	-+- TTA	AAG	AGT	GAA	CAC	CCC	ATG'	rat	GAG	AGG	TAA	GAA	GAG	AA!	ACC	GAC	CTG	CTT	
	F	P	E	I	s	н	L	W	G	т	Y	s	P	F	F	s	L	A	I)	E	-
	TC'	TGC	TAT	TTC	TCC	AGA	CGT	TCC.	AAA	GGG'	TTG	TAG	AGI	'TAC	TTT	rcg:	rtc	AAC	TT:	ГТG - - -	TCT	240
181	AG	 ACG	 ATA	-+- AAG	AGG	TCT	+ GCA	agg	 TTT	CCC	AAC	ATC	TCA	ATC	AAZ	AGC	\AG'	TTC	CAA	AAC	+ AGA	
	s	Α	I	s	P	D	v	P	к	G	С	R	v	T	F	v	Q	7	7]	<u></u>	s	-
	AG	ACA	.CGG	TGC	TAC	ATA	ccc	AAC	TTC	TTC	TAA	GTC	TAF	\GG(CTT	ACT	CTG	CTT	rtg.	TTA	GAA	300
241	TC	 TGT	 GCC	-+-	 SATC	 TAT	+	 TTG	AAG	AAG	+ LTA	CAC	ATT	rcc	GAA'	rga(GAC	GA/	AAC	TAA	CTT	300
	R	н	G	A	R	Y	P	т	s	s	ĸ	s	ĸ	A	Y	s	Α	.]	L	I	E	-
	GC	TAT	TCF	\AA!	AGA	ACGC	CTAC	TGC	TTT	CAA	.GGC	TA	AGT	ACG	CTT'	TCT	TGA	AG	ACT	TAC	CAAT	360
301	CG	ATA	AGT	+ : [TT]	rcti	rgco	TAE	ACC	AAA	GTI	CCC	CAT	rca'	rgc	GAA.	AGA	ACT	TC'	TGA	ATC	TTA	360
	Α	I	Q	ĸ	N	A	т	A	F	K	G	к	Y	A	F	L	K	ζ '	т	Y	N	-
	T <i>I</i>	ACAG	CTT:	rgg	GTG(CTG	ACG?	ACT	rgac	CTCC	CAT	rcg	GTG.	AAC	AAC	AAA	TGC	TT.	AAC	TC:	rggt	420
361	A.	rgt(JAA	ACC	CAC	GAC	rgc:	rga/	ACTO	GAG	JTA	AGC	CAC	TTG	TTG	TTT	'ACC	CAA	TTC	AG	ACCA	420
	Y	т	L	G	A	D	D	L	т	P	F	G	E	Q	. Q	, M	ı v	J	N	s	G	-
	A'	TTA	AGT'	TCT.	ACA	GAA	GAT	ACA	AGG	CTT'	rgg	СТА	GAA	AGA	TTG	TTC	CA	ГТС	'AT'	'AG	AGCT	1 400
421	L - T	- - - AAT'	 TCA	+ AGA	 TGT	<i>-</i> CTT	- -	+ - <i>-</i> TGT'	TCC	GAA	-+- ACC	GAT	- - -	r TCT	'AAC	CAAC	GT	AAG	TA	ATC	TCGP	480
	I	K	F	Y	R	R	Y	K	A	L	Α	R	. K	: 1		<i>7</i> I	? 1	F	I	R	A	-
	т	CTG	GTT	CTG	ACA	.GAG	TTA	TTG	CTT	CTG	CCG	AAA	AGI	TC	TTC	JAAE	GT'	TTC	CA	ATC	TGCT	[E41
483	1 - A	GAC	CAA	+ GAC	 TGT:	CTC	 TAA!	+ AAC	 GAA	 GAC	GGC	 TTT!	TCF	AAG	 CAA	CTT	CCA.	AAC	GT'	ГAG	ACG	+ 540 A
	s	G	, s	; r) R	ı V	, i	A	s	A	. E	: F	Œ	? :	[]	E (3	F	Q	s	A	-

Fig. 24a

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52/56

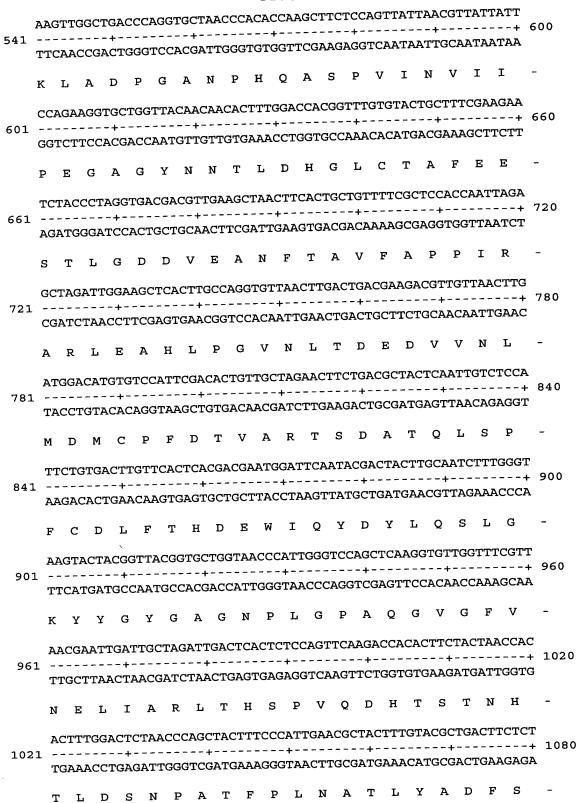


Fig. 24b





1081	CAC	CGA	CAAC	CAC'	TAT(GT.	TTC:	ΓΑΤ' 	TTT(CTT	CGC':	TTT(GGG' 	TTT(-+-	GTA 	CAA 	CGG' +	ΓΑC' 	TAA(GCCA	1140
1081	GT	3CT(GTT(GTG/	ATA	CCA	AAG	ATA	AAA	GAA	GCG2	AAA	CCC	AAA	CAT	GTT	GCC.	ATG	ATT	CGGT	
	н	D	N	т	M	v	s	I	F	F	A	L	G	L	Y	N	G	T	K	P	-
	TT	GTC'	TAC'	TAC'	TTC'	TGT'	TGA.	ATC	TAT	TGA	AGA.	AAC	TGA	CGG	TTA	CTC	TGC	TTC	TTG 	GACT	1200
1141	AA	CAG	ATG	-+- ATG	AAG	aca	ACT	TAG	ATA	ACT	TCT	TTG	ACT	GCC	TAA	GAG	ACG	AAG	AAC	CTGA	
	L	s	T	T	s	v	E	s	I	E	E	T	D	G	Y	s	A	s	W	T	-
	GT	TCC	ATT	CGC	TGC	TAG	AGC	TTA	.CGT	TGA	AAT	GAT	GCA	ATG	TGA	AGC	TGA	AAA.	GGA	ACCA	1260
1201	CA	AGG	TAA	.GCG	ACG	ATC	TCG	LAA	'GCA	ACT	TTA	CTA	CGI	TAC	ACI	TCG	ACT	TTT	CCI	TGGT	
	v	P	F	A	A	R	A	Y	v	E	M	M	Q	С	E	A	E	K	E	P	-
	тт	GGT	TAG	AGT	TTT	GGT	TAA	CGA	CAG	AGT	TGT	TCC	CATI	GCA	CGC	TTC	TGC	TG1	TGA	ACAAG +	1320
1261	AA	CCA	ATC	TCA	AAA	CCA	TTA	GC1	GTC	TCF	ACA	AGC	TAF	ACGT	GCC	CAAC	CACC	BACI	\AC'	rgttc	
	L	v	R	v	L	v	N	D	R	v	V	P	L	Н	G	C	A	V	D	K	-
	TI	GGG	PAT	ATC	STAP	GAC	AGA	ACGZ	ACTI	rcg7	TG#	AAG	3TT:	rgt(CTT	rcg(CTA(3AT(CTG	3TGGT +	1380
1321	AA	CCC	CATO	CTAC	CATI	CTC	CTCI	rgc:	rga <i>i</i>	AGC	AACI	rtc	CAA	ACA	JAA	AGC	GAT(CTA	GAC	CACCA	
	L	G	R	С	K	R	D	D	F	v	Ε	G	L	s	F	A	R	s	G	G	-
1381					TAA					140	1										
1381					TTA					110	-										
	N	W	E	E	С	F	A	*													





					GTC			_		4				-+-							-	50
1	 TAC	CCG	CAC	AAC	CAC	CAC	GAI	GAC	CAGO	· AATE	\CG0	TGC	AAE	CAA	GCC.	AAG	GTG	TAG	GCC	AT	GG	
	M	G	v	F	v	v	L	L	s	I	A	T	L	F	G	s	Т	s	G	Т		-
	GCC	TTC	GGT	rcc'	rcgi	rgg"	CAAT	rtci	rca(CTC:	rtg:	rga(CAC	TGT	TGA	CGG	TGG +	TTF	CCZ	TA/ 	GT -+	120
61	CGG	AA(CCC	- + - · AGG2	AGC	ACC	TTA	AAGZ	AGT(GAG	AAC	ACT	GTG.	ACA	ACT	GCC	ACC	'AA'	rgg'	ГТА	CA	
	A	L	G	P	R	G	N	s	н	s	С	D	т	V	D	G	G	Y	Q	C	!	-
121	TTC	CCC	AGA	AAT'	TTC:	rca(CTT	GTG	GGG'	TAC	ATA	CTC	TCC	ATT	CTT	CTC	TTT:	rgg(CTG.	ACG	AA -+	180
121	AAC	 3GG'	rct'	-+- TTA	AAG	AGT	GAA	CAC	CCC	ATG	TAT	GAG	AGG	TAA	GAA	GAG	AAZ	/CC	GAC	TGC	CTT	
	F	P	E	I	s	н	L	W	G	т	Y	s	P	F	F	s	L	A	D	F	3	-
181	TC:	rgc	TAT	TTC	TCC	AGA	CGT	TCC	AAA	.GGG	TTG	TAG	AGT	TAC	TT:	rcg:	TCZ	AAG +	TTT 	TG:	rct +	240
181	AG	ACG	 ATA	-+- AAG	AGG	TCT	GCA	AGG	TTT	ccc	AAC	ATC	TCF	ATO	3AA	AGC	AAG'	TTC	AAA	AC	AGA	
	s	A	I	s	P	D	v	P	K	G	С	R	V	T	F	V	Q	V	I	. :	S	-
	AG	ACA	CGG	TGC	TAG	ATA	CCC	AAC	TTC	TTC	TGC	GTC	TAZ	AGG(CTT	ACT	CTG 	CTT +	TGA	TT(-	GAA +	300
241	TC	TGI	GCC	CACG	ATC	TAT	GGC	TTC	JAAC	AAG	ACC	CAC	TAE	rcc	GAA'	TGA	GAC	GAA	ACI	AA	CTT	
	R	н		A		Y	P	т	s	-	A				Y					_	E	-
								L -			-+-			+				· -			AAT +	360
301	CG	ATA	AAG'	rtt'	rct'	rgc	TAE	GAC(GAA	AGT'	rcc	CAT'	TCA	TGC	GAA	AGA	ACI	TCT	rga.	ATG	ATT	
	A	I	Q							K							, F				N	-
2.5											-+-			+							GGT	120
36.	A.	rgT	GAA	ACC	CAC	GAC	TGC	TGA	ACT	GAG	GTA	AGC	CAC	.T.L.C	3.1.1.C	2.T.T.1	ACC	-AA	110	AOI	1001	-
																					G	
40											-+-				+						AGC1 1	
42	T.	TAA	TCA	AGA	TGT	CTI	CTA	TGT	TCC	GAA	ACC	'GA'	CT".	rrc.	LAA	CAA	JG 1.	AAG	ınr	110	ıcor	•
																					A	
4.0											4 -	·			+			-+-			TGC'	+ 246
48	_ A	GAC	CCA	AGA	CTGI	CTC	CAA:	raa(CGA	AGA(CGG	CTT'	TTC.	AAG	TAA	CTT	CCA	AAC	. 1.06	LAG	ACG	A
	S		3 5	S I) I	5 7	J :	I A	A.	s i	A 1	E :	K	F	I	E	G	F	Q	s	Α	-

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Fig. 25a





55/56

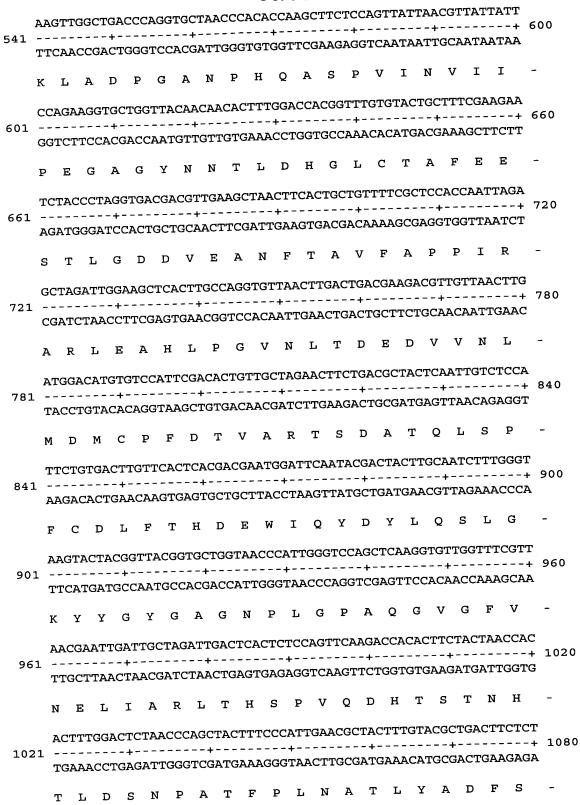


Fig. 25b





																				GCCA	1140
1081																				CGGT	
	н	D	N	т	M	v	s	I	F	F	A	L	G	L	Y	N	G	T	к	P	-
1141			-	-+-	-	- - -	+				+			-+-			+	-		GACT + CTGA	1200
	L	s	т	T	s	v	E	s	I	E	E	Т	D	G	Y	s	A	s	W	T	-
1201	GTTCCATTCGCTGCTAGAGCTTACGTTGAAATGATGCAATGTGAAGCTGAAAAGGAACCA 1201+ 1 CAAGGTAAGCGACGATCTCGAATGCAACTTTACTACGTTACACTTCGACTTTTCCTTGGT																				
	v	P	F	A	A	R	A	Y	v	E	M	M	Q	С	E	A	E	K	E	P	-
V P F A A R A Y V E M M Q C E A E K E P TTGGTTAGAGTTTTGGTTAACGACAGAGTTGTTCCATTGCACGGTTGTGCTGTTGACAAG 1261+																					
1201																				GTTC	
	L	V	R	v	L	v	N	D	R	v	v	P	L	н	G	С	A	V	D	K	-
1321				-+-		-	+	. -			+			-+-			+			TGGT + ACCA	1380
	L	G	R	С	ĸ	R	D	D	F	v	E	G	L	s	F	A	R	s	G	G	-
1381		CTG GAC		- + -			+	. – – -	- 1	.404											

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